

Aviation News

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JULY 17, 1944



Aircraft Spokesmen Look to the Future: While preparing for peace, the aircraft industry is intensifying military production and these industry leaders, speaking for the Aeronautical Chamber of Commerce, presented the aviation point of view of the future at a Senate committee hearing last week. Left to right, Joseph T. Geuting, Jr., General Aircraft; J. Carlton Ward, Jr., Fairchild; Eugene E. Wilson, United Aircraft and Harry B. Woodhead, Consolidated Vultee.

Patterson Urges Preservation of Plane Plant

Under-Secretary of War tells Senate group that only a large scale operation will preserve our world air leadership.....Page 11

See Strong Air Industry As Answer to Problems

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Comprehensive program formulated for development of private flying, local airport construction standardization of practices.....Page 13

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Group, with Personal Aircraft body, emerges as main operating unit of Chamber as a result of revitalization program.....Page 15

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Concentrated raids on oil sources expected to be reflected in further sharp curtailment of Luftwaffe and mechanized army.....Page 19

Test Plan to Absorb Loss on Company-Owned Surplus

Materials may be sold to the government for \$1 and adjustments made in renegotiation and tax proceedings.....Page 34

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Industry Asks Cutbacks First in Converted Plants

Spokesmen suggest that cancellations become effective first among temporary manufacturers with post-war markets.....Page 30



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THE AVIATION NEWS

Washington Observer

THE P-42—There were occasional strong rumors only a month ago that the Army Air Force was swinging back to the use of only liquid-cooled engines for its fighters. But the new increased schedule for P-42's at least delays the swing. The P-42 has proved virtually incompatible as an all-purpose fighter and his won at least a partial victory for air-cooled engines.

LABOR BEFORE CONGRESS—There was an interesting contrast between the presentation made by executives of the aircraft industry and labor leaders before the Murray Committee. Senator Murray is known widely as a good friend of labor, and most observers felt that labor would receive an extremely sympathetic hearing. But Richard Frankelstein, UAW-CIO vice-president, saw fit to criticize roundly the Senator and Congress and drew a stinging rebuke for his pains. The day before, Murray and J. Carlton Ward, Jr., got into a serious discussion of the role played by labor in the French debacle, and by contrast Ward's handling of himself was considered statesmanlike.

FORD PRODUCTION—The recent announcement by Ford that 5,000 "Liberator" have been produced by that company and that a high daily output rate is being maintained puts Ford in a position which many had about two years ago would not be able to attain. It is true that many ill-advised production claims were made for Ford when the Willow Run project started. But the fact remains that difficult obstacles were overcome, that Ford is building bombers at a record-breaking rate, that his output is a highly important factor in over-all aircraft production and that the efficiency rate at Willow

Run has risen to a point reported well above that of many old-line aircraft manufacturers.

LAPS ACKNOWLEDGED—Laps in the production of some weapons of war are acknowledged by War Production Board officials and the important reasons for the slackening are difficult to identify. For one, manpower shortage is not blamed. There are reports that some subcontractors are easing out of war production work to get into a better position for civilian production and that prime contractors have taken over projects formerly handled by subcontractors. Meanwhile, military leaders warn against overoptimism, while the Foreign Economic Administration and Germany will be in a nearly hopeless position economically by the end of this year and that her defeat in 1945, if not in 1944, is a certainty.

MISFIRE—Although it doesn't affect the aviation industry directly, criticism in some Army circles about the distribution of expensive miniature models by a rifle manufacturer should be heeded. This company makes a highly effective mobile unit, but even the excellence of his product did not save him when he loaded out miniature models of the truck unit to many high-ranking officers. The sets probably cost a minimum of \$10 each. It was a nice gesture, but it misfired. Even in the Pentagon some people are getting ceanany-minded.

DISARMAMENT AGAIN?—Even today, with the war furiously underway, aviation spokesmen before Congressional committees are finding that the pre-war theory of disarmament as an example to the rest of the world is gaining



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PRODUCTION SIDELIGHTS—These industry reports are the topic of discussion in Washington:

TWA and Lockheed are considering construction of a belly-lifter on the production models of the "Constellation" to increase cargo space.

Northrop is now studying possibility of re-vamping its military "Black Widow" as a feeder line transport for about 24 passengers, among other commercial uses.

Calver Aircraft officials are poring over paper plans for a small, single-plane, high-speed executive plane for post-war production.

Republic Aviation is studying possible market for a single-engine amphibian for the private flying field.

Foreign sources report that during the invasion of France two Waco gliders were sometimes attached to each Douglas C-47 instead of one.

Maritime officials say no helicopters will be placed on board ships as subdetectors, despite previous reports. Other devices in the submarine campaign are more effective.

Because of the anticipated growth of international aviation and the need for guidance, the post-war world will see more tankers plying the seas than ever before, shipping officials here say.

The decision is part Bombardier's Merlon engine on the Canadian-built DC-4 is pushed engineers since the Merlon is not as efficient as low-speed, low-garage conditions inherent in transport flying, and Trans-Canada Air Lines has had difficulties with the Merlon on the trans-Atlantic work recently. In addition, some re-designing of the DC-4 will be necessary. Canadian observers say the decision was political, to give a British touch to the aircraft, since Britain may be a Canadian customer for this model.

SERVICES VS WPB—The struggle between WPB and the Army and Navy over extent of civilian production so far permitted in the next few months was not settled last week, announcements to the contrary. The subject will pop up again within a few weeks. Army was about 33 percent off in some of its estimates for certain

Washington Observer

types of weapons required in North Africa and put through immediate changes in orders, cancelling some, greatly increasing others. The latest orders for artillery shells and other heavy stuff indicates revisions made necessary after the invasion of France. Army wants industry able to take on new jobs immediately, and feels that conversion to civilian production would prevent slack action.

PILOT "CONVERSION"—Control and re-education of military pilots, whether they are in leave, discharged, or facing eventual return to civilian life, is causing much concern in Washington, despite the Army's recent crash-die-ins on careless pilots. CAA officials point out that private plane owners, eager to welcome the homecoming aviator, urge him to fly their planes. The pilot, eager to fly, takes off with perhaps limited ability to handle the slower and lower-powered civilian plane. CAA regulations have been prepared in an attempt to curb the increasing number of accidents to returned service pilots.

AIR AMBULANCES—Virtually all wounded from the Normandy Penalties are being evacuated by air to hospitals in England, and the mortality rate among these men is less than one percent. In the first days of the Normandy landings, wounded were evacuated in LSTs and transports, but after about 10 days the task was taken over by the air evacuation units and, generally speaking, all are being flown back to England.

ROBINS AWAY—Increasing difficulty is being encountered in obtaining greater expansion production of heavy ammunition and bombs to meet the heavy expenditures of our forces. Retard-shocking air attacks on Europe and a stepped-up tempo in the Pacific will make it necessary to increase our bomb program during 1944 by 50,000 tons a month. Shortages in steel pipes and sheet, and shortages in malleable castings, all resulting from lack of sufficient manganese, are directly contributing to the production difficulties.

DOUGLAS ANSWER—Immediately after the Lockheed Constellation's record-breaking West-East non-stop flight, Douglas engineers let it be known to airlines and friendly foreign government officials that they had plans for the DC-6 for post-war airlines. The DC-6 is an improved DC-4 with a fuselage about seven feet longer, a better door arrangement, a pressurized cabin, and four Pratt & Whitney 2,000 hp engines contrasting with the 1,450 takeoff horsepower processed for the DC-4.

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ACCA Sees Strong Air Industry Answer to Defense, Job Problems

Manufacturers' report to Murray Committee cites need of constant research and preparedness as well as trade and cultural benefits resulting from broad aviation policy.

By WILLIAM G. KEY

The aircraft industry made its most effective presentation in years before a Congressional body last week, a program for the future of aviation and its relation to the economy of the nation offered in such detail as to make its contents virtually predictable.

In substance, leading spokesmen for the industry contended that the American people and the aircraft industry have a long-range participation in planning the future of domestic and international air transport—and this investment in air power will pay rich dividends in future security, economic progress, employment and in the broad advance of civilization through relative military security and the elimination of frontiers and promotion of international understanding.

► **Forewarned by ACCA Spokesmen**—The industry's viewpoint to Congress was submitted through the War Costs and Subsidies Committee of the Senate Military Affairs Committee. Four spokesmen for the Aeronautical Chamber of Commerce pictured the future of the industry in broad strokes before the subcommittee headed by Senator Murray (D-Mont.).

The master note, Eugene E. Wilson, vice chairman of United Aircraft and chairman of the board of governors of the ACCA, told the Murray body, is the maintenance of air power as the aircraft industry is moved from war to peace. Technological development through competitive industry is the key to air power, Wilson said, asking that new legislation be drawn to restate as national policy the principle of advancing technological development of aviation through competitive private industry.

► **Employment Problem**—The problem of employment and the avoidance of a violent economic adjustment for the majority of the 3,100,000 workers in the aircraft industry is spread in the words of the industry, the committee was told, and the ACCA supports the principle of unemployment compensation, transportation of workers to home areas or other jobs and in-work retraining of workers for jobs in other industries.

The industry does oppose the payment of severance wages to war workers on an order basis upon the industries and people of the country and the projected compensation bill makes termination pay unnecessary, the Murray group was told. This viewpoint was sharply rejected by Richard Frankforter, UAW-CIO vice president, who warned that aircraft workers were seeking

severance pay provisions through reopening of labor agreements in the industry, and would insist on National War Labor Board concurrences.

The industry stressed that the industry represents a large share of the general problem of the readjustment of labor and that the problem is not that alone of the aircraft industry but of the national economy as a whole. The industry, Mr. Wilson warned, may have difficulty in meeting its present obligations, to say nothing of assuming additional burdens.

► **Aircraft Workers' Demands**—On the other hand, Frankforter said that aircraft workers would demand not only severance pay—eight weeks pay for all services of longer than a year, four weeks for service between six months and a year—but also security provisions that offer in some measure an orderly procedure for reabsorbing the returned servicemen, and increased wage rates to compensate for reduction in overtime and hours worked per week.

Frankforter maintained that the aircraft industry is too concerned with reconversion problems and not enough with post-war planning, that labor is not being concerned with common problems of all industry; that the armed services in asking a con-



Woodhead Explains Industry's Viewpoint: Harry Woodhead, president of Consolidated Valve, is shown testifying at a hearing of the War Costs and Subsidies Committee of the Senate Military Affairs Committee. Others, left to right, who also appeared before the committee, are J. Carlton Ward, Jr., Forehead; Eugene E. Wilson, United Aircraft, and back to camera, Joseph T. Gearing, General Aircraft.



Aircraft Meeting Draws Crowd—Leading spokesmen for the aircraft industry met last week before a war contracts subcommittee of the Senate Military Affairs committee, drawing a large crowd of operators, part of which is shown above.

torized high level of production are attempting to throw "discredit on war workers," that Congress is not acting fast enough to provide "adequate unemployment compensation," that air transport must reduce its rates, that a National Aircraft Development Council should be formed and that later must have a voice on this council, and that wage rates should be increased sufficiently to a high enough level of consumer purchasing power to expand private flying.

Northrop Plan.—The Northrop Plan for post-war employee relations was submitted to the committee by LaVerne T. Ceba, chairman of the board and general manager of Northrop. Through the Northrop Plan he said, it is hoped to channel skilled employees back into industries for which the employees are fitted by previous experience. The Northrop Plan fund was outlined in the March issue of Aviation magazine.

In order that the nation may have a strong and viable post-war aircraft industry, Harry Woodhead, president of Consolidated Vultee, told the Murray body that the government should now permit the aircraft industry to use a part of its engineering, tooling and manufacturing facilities for development of civilian aircraft, and that should make available to each company-flood-free, as well as flood-price manufacturers, at a nominal cost the design and engineering data, tooling and other facilities developed for the military aircraft which might be adaptable,

at least in part, to his civilian aircraft.
Employment Program.—As long as there is no interference with the war effort, Mr. Woodhead said, it is undoubtedly to the benefit of the country as a whole to have all opportunities for post-war employment prepared for in advance, so that production and employment

may start promptly when the war ends.

Mr. Woodhead also urged that the government immediately formulate policies in regard to transport airlines with emphasis on development of a planned and integrated feeder line system, increased use of air mail, expedited review of new planes to the airlines and further development of main lines, both foreign and domestic.

Technical Development.—The fact that technical development is the key to air power was expounded by J. Carlton Ward, Jr., president of Fairchild Engine and Airplane Corp., who pointed to Britain's development of radar and German use of the rocket bomb both of which first were utilized in this country. Mr. Ward developed the lesson of France, to which country he headed a production mission when that country's aircraft industry virtually collapsed under the war tempo strains. The automated engine factory was the worst example, Mr. Ward said, of the engine trade and became a political football. France, he pointed out, was not given time to work herself out of her inferior position.

Even the Germans made the mis-

take of superimposing government direction of basic policies on private management of aircraft companies. This resulted in near total aircraft stagnation from 1934 to 1939, said Mr. Ward, such as the freezing of models to produce in quantity and lack of any emphasis on aircraft as defensive as well as offensive weapons.

Critics Need of Research.—Mr. Ward then detailed the enormous and complex problems of negotiating plans from design to normal stages and the length of time it takes to perfect modern aircraft in support of his contention that constant research and development will be vital to the maintenance of American air power. He cited the more than 2,000 changes made in the Boeing Flying Fortress to bring it to its present stage as a first-class fighting airplane.

Our country cannot expect to

Aviation's 'Musts'

Some of the things the aircraft industry must do during and after the adjustment of the reconstruction period is outlined by Eugene E. Wilson, vice-president of United Aircraft and chairman of the board of governors of the Aeronautical Chamber.

We must not only maintain adequate air power if we are to achieve air power, but we must advance the design of all aircraft and produce new designs.
We must train combat crews and ground personnel, extend meteorological and navigational knowledge and develop and improve our engines and our communications.

We must increase landing facilities and extend airports.
We must provide for research.
We must improve our materials and simplify our manufacturing procedures.
We must maintain our job and hold and keep adequate facilities in modern, employing as many as possible of our thousands upon thousands of skilled workers so that our nation will not lose their contributions to air power.

In addition, Wilson said, we have our own best interest in staying in business on a sound basis, to maintain a viable profit while efficiently serving the post-war aircraft needs of the nation.

hold its position in world affairs of the principles of air power are not grasped and implemented by a war policy for continued development of aircraft, said the Murray subcommittee.

Ask Forgotten Policy.—Had the present war been delayed a few years, the United States would have been a third-rate power, Mr. Ward pointed out, if totalitarian governments continued heavy subsidies for aircraft industries while this country neglected that phase of air power. The second rule of survival of this country do not wait a national subsidy but, he said, they do suggest a national air policy that will allow the aircraft industry to strengthen leadership in design and engineering to restore large-scale military production at any time if it should be necessary.

In addition, such a policy contemplates an air force maintained in such a level as to raise the nation of adequate air defense and. The suggestion outline a program for maximum preparedness, compatible with full security and which will permit rapid expansion in time of emergency.

Air power, he said, encompasses several elements, among them: airplanes, trained personnel, technical staff, management and production capacity. All are essential, Mr. Ward said, adding that a strong industry must be maintained with operating productive capacity at least equal to the current needs of the armed services. Additional capacity he developed, peakshock through built-up plants should be available and ready as the necessity arises.

Books to Guard Materials.—Undersecretary of War and Aeronautics told Congress that the expected large numbers of surplus military aircraft must be sold "in a way that will not have a bad effect on the markets of the aircraft industry." He added that he regarded it as vitally necessary for the Government to retain the right Government-owned aircraft assembly plants as a reserve for any future emergency. It might be desirable, he said, to add several DPC aircraft and aircraft engine plants to the list, but he did not specify which ones.

Arthur L. Getts, assistant Secretary of the Navy for Air, agreed with Peterson that certain war plane should be maintained for future reserve production. He listed the following post-war program acceptable to the Navy:

- Maintaining adequate surplus at such strength and in such state of readiness as to provide a successful assault upon our country or its possessions.
- Acquiring and maintaining air bases essential to our security and overseas trade.
- Maintaining the orderly and economic expansion of domestic and international air transport and private flying.
- Preserving a strong aircraft manufacturing industry.

This program agrees, in substance, with that advanced by the government for the aircraft industry which testified earlier.

ACCA Gives Views On Plane Disposal

Agrees in general with Harvard report but poses several objections to Murray Committee.

Aeronautical Chamber of Commerce agrees generally with the surplus airplane disposal report of the Harvard School of Business and, in contrast to the War Contracts Subcommittee of the Senate Military Affairs Committee several objections to the plan. It also outlined its views as expressed to the House Surplus Aircraft Advisory Subcommittee on the general policies to be followed in disposing of surplus aircraft.

With Harry Woodhead, president of Consolidated Vultee, as spokesman, the ACCA also covered disposal of surplus engine, guns, and airfield, urging that each company operating a government factory be given an opportunity to buy or lease of reasonable losses for parts and if aircraft facilities cannot be used by either the original occupant or others, the facilities should be kept under private management as stand-by plants for defense industry. Under no circumstances should the plants be operated by the government, Mr. Woodhead said.

Central Agency Urged.—All policies regarding disposal of surplus planes should be coordinated by a government agency created by legislation, the Murray Committee was told.

Military planes maintained by foreign nations should be scrapped, the Chamber believed, and possible planes should be sold, leased or bartered to friendly foreign nations under control of the War, Navy and State Departments.

Wherever possible, Mr. Wood-

Industry's Problem

To illustrate the complex problem of building a combat aircraft and the need for continued technological development, Crittendon Ward, Jr., president of Fairchild, used the following information for the Murray Committee about the Flying Fortress supplied by W. E. Bend, Boeing vice president in charge of engineering.

The Boeing B-29 was conceived in 1934 and first flown in the summer of 1938. It was the first of the four-engined, long-range, heavy bombardment airplanes. The basic design was good, yet between the prototype and the current model, the B-29D, there has been an enormous expenditure of engineering man-hours in redesign, development and research.

In the B-29D series, 120,000 engineering man-hours were expended, primarily on the twelve superchargers for high-altitude performance. An additional 265,470 man-hours were invested in the B-29D. Total production amount something over half, improving overall performance.

The B-17C and D series, 264,356 man-hours were required to improve the armament, install more powerful engines, develop a self-sealing fuel tanks and a proof armor.

At the time war was declared on Japan in 1941, the B-17s were ready at a cost of 264,775 additional engineering man-hours, with the new design and enlarged substructure for better stability and the tail turret. The upper and lower gun turrets and defensive light control equipment were added as well as the bomb-throwing device. Bombing runs also were going on at this time. In the F and G series, many detail improvements were incorporated, with a staggering total of 1,588,000 man-hours. Changes dictated by technological advances and combat experience were incorporated in the new series in mere a day, with total changes of the E and G series amounting 2,038 to date. The total number of engineering man-hours on improvement is 1,588,000, with a total cost of \$1,722,575, as of June 1.

the plants), providing of new tools, and other equipment and the rehabilitation of the old, and the possible forward planning of tentative requirements for materials and components.

U. S. Army Engineers have approved a \$150,000 facilities expansion program for Cleveland's Willow Run Division in addition to a recently announced \$1.5 million expansion program already under way.

Willow Run May Turn Out Tractors

Ford officials deny plans will be taken over by government for use as warehouses.

Ford's huge Willow Run plant, which probably has had more publicity of both kinds than any similar plant in the country, probably will be taken over by the Ford Motor Co., whose officials made sharp and prompt retort to unofficial reports that the sprawling establishment might be utilized by the government for warehouse purposes during the recession period.

Ford officials indicated that the company might use the plant, or part of it, for manufacture of aircraft, most likely cargo planes. The plant is so large, however, that there would be ample space for the production of tractors or other farm equipment.

Farm Equipment—It appeared

that farm equipment was a much more probable product from Willow Run after the war than aircraft, although aircraft was not entirely eliminated in the opinion of some Ford officials.

The Fordson tractor was a familiar sight in many American farms before the war and there are indications that Henry Ford would like to put his tractor in the same category as his automobile—a low-priced vehicle which almost anybody could own.

First Choice on Plant—Ford officials vigorously defended their interpretation of the contract with the government, stating that "if we understood our contract with the government correctly, we have first opportunity on purchasing Willow Run after the war. Our plan, as they can be made during these changing times, do not call for making Willow Run into a huge warehouse or storage facility as recent Washington reports indicated. The government built the plant and Ford operates it. Willow Run was constructed under the most specialized of plans—it is capable to manufacture some sort of product at Willow Run."

A hint that the plant might be used for purposes other than aircraft production was seen in a final phrase of the statement that "the needs of the post-war world, and the growing realization that almost everything we need in manufac-

turing or food items can be grown on the farm, places increased emphasis on tractors."

Saipan Air Umbrella Cited by Forrestal

Secretary Forrestal, in reviewing the significance of Saipan, noted that the role of the Naval air arm as involved in the Saipan operation demonstrated for the first time the ability of carrier-based aircraft to hold "an assumed air umbrella over a land invasion for a sustained period of time."

For a month, carrier based aircraft executed air control over the Marianas Islands. Our carriers held up the air umbrella at a distance of more than 1,200 miles from their bases in the Marshalls and 2,200 miles from their major base at Pearl Harbor.

Nullified Jap Raids—The umbrella was completely anothered enemy air activity at 13 air bases in the Marianas and Bonin that, although the Japs saw bombing attacks daily against Saipan. All of them were too weak to be of any military significance.

The Navy Secretary and that achievement was without precedent in naval warfare and that never before have carrier based planes sustained a continuous, unbroken cover over an invasion for so long a time.

Importance of Small Operator Stressed by Port Executives

Comprehensive program for development of private flying, local airport construction and beautification, standardization of practices and legislation formulated at Chicago convention.

By ALEXANDER MCKELLY

Importance of the small airport and the fixed base operator in the aviation picture gained increased recognition at the American Association of Airport Executives convention last week at Chicago.

Forum sessions drew 130 delegates and gave opportunity for vigorous expressions by such spokesmen as Oliver Parks of Parks Air College, East St. Louis; W. T. Piper, president of Piper Aircraft Corp., Lockhaven, Pa., and the convention banquet speaker, Col. Rance Turner, Indianapolis fixed base operator and president of National Aviation Trades Association.

Recommendations—In closed session, small airport men drafted a recommendation for a separate division for private flying operators within the association, called for an association program to plan recreation facilities and beautification of small airports, investigation of possibility of Federal aid for private airport development and standardization of accounting procedures and exchange of monthly operating statements through the association.

Exchange of carnivals between flying schools, and investigation of radio-aid service for private airports.

CAA operation of all controlled towers governing interstate traffic.

Rental payments from Federal agencies using airport space, equal to payments from other tenants for similar space.

Transferring authority for certifying aviation gasoline from OPWA to CAA.

private airports. The recommendations were not acted on by the convention, but turned over to the board of directors.

Fees Studied—Probably the most significant single accomplishment of the convention, as far as larger airports and airlines are concerned, was establishment of a committee to study schedules of fees for airlines, headed by Howard Crush, Cincinnati, Lambert Airport manager. Study was undertaken, responding to repeated demands from the floor, for a formula on which airports could set up a standard fee basis for airline flights, taking into consideration service and facilities at airport, weight of planes, frequency of schedules, population served by the airport, and other criteria.

Resolutions at the closing session called for CAA operation of all controlled towers governing interstate traffic. Rental payments from Federal agencies using airport space, equal to payments from other tenants for similar space.

Transferring authority for certifying aviation gasoline from OPWA to CAA.

Study by CAA to standardize airport terminology.

Authorization for CAA to pool surplus military equipment usable by airports for disposal.

Appointment by the board of directors of an executive director of the association and establishment of several classes of membership.

Furtherance of university education programs training airport managers.

Revision of CAA specifications on airport lighting equipment, to lower cost without increasing maintenance, and providing when possible for continuing use of existing equipment.

Reorganizing the leadership of National Tax, McCarran and Representative James Randolph, in national aviation legislation, the association named both men honorary life members.

Legislation—Requests for association endorsement of the Randolph-sponsored HR 3524, which would provide joint Federal-State aid for airport development, were referred to the board of directors for future action.

May Charles E. Harst, president, formerly Dallas, Tex., airport manager now with the ATC at Kansas City, and George Moore, secretary-treasurer, Peoria, Ill., were re-elected. Other officers named are Woodruff DeWitt, Los Angeles airport manager, first vice-president; Neil Bruckenstein, Lansing (Mich.) Airport manager, second vice-president; Crush, third vice-president; Clyde Triggs, Peoria, legal counsel, and the following directors: Francis Geng,



SKYNASTER PRODUCTION:

The extent to which the Douglas C-54 Skynaster is being turned out at the Chicago plant is indicated by this view of the assembly line where the wings are

attached to the fuselage. This plant uses 15 percent above its production schedule last month, according to the company's reports.



PROBABLE ROCKET PLANE LAUNCHING SITE:

Photo on left, looking northwest, shows construction of what is believed to be a launching platform for Hitler's rocket planes used against England. Photo



on right, taken from the air, shows a probable rocket launching site found by the Allies a mile southeast of Cherbourg.

St. Paul, Fred Alley, Charleston, W. Va.; Paul Keenan, Houston, Tex.; Myron Kram, Reading, Pa.; and Louis Gross, Toledo, O.

Observations—Significant statements by convention speakers: "I figure, there's too much talk about Federal air. After the war the government won't have enough money to pay the Congressmen, let alone finance airports. We had better pay our own way."

Robert Aldrich, St. Paul: We need studies on hangars for private flyers and facilities to benefit the airport.

Roscoe Turner: Aviation control should be cooperative between state and Federal governments. There's no reason why we can't have cooperation if we sit at with both groups.

Charles Donaldson, CAA: Later runway built by the CAA to military specifications will take 74,000 pounds gross loading, but some earlier ones will take only 30,000 pounds. On most airports we have 4,000 pounds will do the job for some time to come, but some key airports for trans-Atlantic flight will take heavier loads. As planes get bigger the designs will have to spread the load. About 110,000 pounds may be the top load.

Hart Bowman, Dallas: We ought to change the name "air terminal." That means "the end of the line." And only a few of our airports are at the end of a line. We have to be thinking about feeder airlines in planning landing fee rates, so that our schedules will be equitable for them.

Dudley Swan, Burbank: We have to be thinking about servicing big planes with gas. Recently it took me nine trucks to service a Constellation. It calls for a big tank with pipelines and portable units or pits.

Dr. John Frobenius, University of Texas: I am appalled that you don't already have a formula for airline fees. We want to set up university training in airport management, and we look to you for help.

Oliver Parks, East St. Louis: Eighty-five per cent of medium-size difficulties with private planes have been eliminated. Air transport can multiply 10 times, from 22,000 to 220,000 persons employed and from 300 to 3,000 planes but it's small compared to the potential of private flying if utility is provided. We can develop the aviation industry to a size one



NEW TEST PILOT INSIDE:

Pilot of the AAF Materiel Command test section, fighter branch, are flying behind a new winged, induced shape as the nose of a North American P-51 Mustang by Capt. Darrell L. Sims. The Mustang depicts a rooster, symbolizing a "cocky" pilot with a cigar at a jaunty angle, riding the cockpit of a rooster fighter plane.

thrust of the automobile industry in 1941.

Sheldon Stearns, Michigan Director of Aeronautics: Realizing the fallacy of attempting to expand airport facilities beyond reasonable limits, we maintain that the day is here when the manufacturer must build into his airplane characteristics that will fit the average airport. Too often we become concerned about the big airports that land four or five times a day and overlook the 800 to 1,000 traffic movements by the small fry.

Electronic Autopilot For Planes Revealed

Device, built around two gyroscopes, is said to be capable of 300 flight corrections a minute.

Details of an electronic autopilot—a wartime improvement of the automatic pilot—have been disclosed, although some four-engine bombers have used them as standard equipment for some time.

The autopilot is an electronic device built around two gyroscopes and it is capable of making more than 300 flight corrections a minute. The gyroscopes are fixed to the plane with the spinning rotors free to move in any direc-

tion. The movement of the airplane around the rotors is picked up by electronics and translated into control of the operation of the rudders, elevators and ailerons with the aid of electric motors strategically located in the aircraft.

Makes Flying Easy—Miningopolis Honeywell, in cooperation with the AAF Materiel Command, developed the autopilot and W. J. McGoldrick, vice-president in charge of aeronautical engineering for the company, said he saw the possibility that the device would make it possible for anyone who can drive an automobile to pilot an airplane. Development thus far made it easy for persons with no flight experience to handle a plane in the air and experiments being conducted by Miningopolis-Honeywell and other companies indicate progress toward its use in take-offs and landings.

Arms Order to Budd

A large heavy-ammunition contract has been received by Edward G. Budd Manufacturing Co., whose order for Convair's all-steel cargo airplanes recently was awarded.

C. Jared Bugnoli, chief of the Philadelphia Ordnance District, estimated that at peak production the artillery shell company would employ 3,000 to 3,500 persons.

Manufacturers Council Gets Major Role in ACCA Revitalization

Group, with Personal Aircraft body, emerges as main operating unit of Chamber, Harry Woodhead, chairman of Western Executive Committee of Manufacturers Council reveals.

The pattern of the new Aeronautical Chamber set-up has emerged along preliminary lines reported in Aviation News June 18 with the completion of the first phase of the reorganization program which points up the dominant position of the Aircraft Manufacturers Council which, with the Personal Aircraft Council, will be the major operating units.

Announcement that the first phase had been completed was made by Harry Woodhead, president of Consolidated Vultee and chairman of the Western Regional Executive Committee of the Manufacturers Aircraft Council after a meeting of the West Coast group in Los Angeles which followed a similar meeting in New York of the Eastern group. H. E. Golden, president of Sperry Gyroscope, is chairman of the Eastern body.

Pattern—The operating pattern of the Aircraft Manufacturers Council is similar to that of the Aircraft War Production Council and points up regional action of the company presidents who make up the two executive committees, as well as advisory committees in specified fields of manufacturing.

Under the program, each regional executive committee meets monthly and action on which the two groups agree becomes the national action of the Aircraft Manufacturers Council. The emergence of the council as a working operating unit is seen by some observers as a means of gradually reabsorbing the name of the Aeronautical Chamber in that of the council and avoids the difficulties involved in a change in the name of the Aeronautical Chamber, which had been proposed.

Personal Aircraft—The Personal Aircraft Council is a development of the Personal Aircraft Committee which has an extensive program for increasing the utility of light airplanes, as outlined in another story in this issue.

The Aircraft Manufacturers Council has as its immediate concern the development of efficient and orderly termination and reorganization processes and to that end a contract termination unit

has been formed to act as liaison between the manufacturers and various government agencies.

Other Committees Authorized—In addition to a contract termination committee, the council has authorized the formation of committees dealing with surplus aircraft, aircraft engines and components, national defense, commercial aviation, research and statistics, public relations and industrial relations.

Separate from the committees of the council, the Chamber setup will include committees on airplane technical, engine technical, propeller technical, accessory and equipment technical, traffic and finance.

Members—The Aircraft Manufacturers Council consists of Boeing, Consolidated, Vultee, Douglas, Lockheed, North American, Northrop, Ryan, Aviation Corp., Bell, Curtiss-Wright, Fairchild, Glenn L. Martin Co., Republic, Bendix

Aviation, Waco, Perry and United Aircraft.

Former departments of the Aeronautical Chamber at Washington headquarters have been reorganized as service bureaus, as previously reported here, in the following fields: Industrial relations, technical, traffic, and public relations. The Economic Bureau embraces the former departments of economic development, research and statistics, legislation and information. These bureaus serve the Aircraft Manufacturers Council and the Personal Aircraft Council, as well as the membership of the Chamber not identified with either council.

The reorganization program was approved after John C. Lee, acting general manager of the Chamber, submitted his progress report on the program since he took over June 1, to the East and West national meetings.

New Spitfire

Disclosed is new prototype of a new Spitfire, the PR Mark XI, an all-metal, single-seat, low wing monoplane used for photographic reconnaissance duties, with cameras fitted in the fuselage.

Has 1,850 Hp. Engine—As reported by the British Information Service, the plane is powered by a



NATS CARGO TO CANAL BREAKS RECORD:

Douglas Skymaster carries plate of the Naval Air Transport Service, Sea, according to the Navy, the two-beam angle motor error caused by air in the Panama Canal Zone recently—carbon engine rotors sent to replace damaged rotors on a tanker carrying fuel oil to the Panama Tank Force 24. One weighed 4,860 pounds. Photo shows a replacement, weighing more than 20,000 pounds, being secured in the hold of the airplane.

Northrop's Model 41, 43 or 43A engine of more than 1,500 hp. and has four four-blade propellers. The four-blade propeller has a hydraulically operated retractable tail wheel unit.

There are two main fuel tanks in the fuselage and long-range tanks are fitted in the leading edges. The Mark XII's dimensions are span 34 feet, 10 inches; length 21 feet, one-half inch; height, tail up, one blade vertical, 11 feet eight inches.

Packard Builds Test Division at Toledo

New unit is designed for development of high altitude engines.

Establishment of a separate Toledo division to handle advanced aircraft engine development is disclosed by Packard Motor Co. officials, who stress the fact that the new establishment is designed to aid in giving the United States an edge in improved powerplants for high altitude fighters.

Charles C. Packard, Packard head, said the division was being established at the specific request of the AAF Materiel Command, and that the company expected the new program would yield powerplants which will go beyond present-day state.

High Liquid-Cooled Engines—Packard manufactures liquid-cooled engines for the Army and Navy which are being tested, only one of the AAF high altitude fighters, Republic's P-47 Thunderbolt being powered by an air-cooled engine, although the B-36, B-29 and B-50 are all powered by air-cooled engines.

Packard has received an additional \$1,336,000 from the Defense Plant Corp. bringing the total to \$4,756,000 for the project. Equipment will include portable test stands, dynamometer cells and other special machinery not specified to simulate high altitude conditions.

Major Test Center—Company officials say the Toledo division will be one of the few fully-equipped engine test centers in the country. It will be under supervision of C. R. Pelen, former chief engineer for Packard.

Production of Rolls-Royce engines parts at the Toledo plant will not be affected by the program, which calls for manufacturing and assembly, test-down and reassembly work.

WEST COAST REPORT

200-Ton Flying Boat May Fly by Jan. 1

Hughes Howard Hughes' could rapidly taking shape, expected to be tested by year-end.

By SCHOLER RANGS

Still, word out of Howard Hughes' 400,000-pound right-engine flying boat rapidly are assuming shape. It may be flying by Jan. 1.

Final assembly of major components by late-fall seems assured. Although a post-end test flights will be predicated on progress of the war and the ability of Aircraft Resources Company to release to the project engines and aircraft components currently assignable only to high-priority warplane production.

250-Jet Spread—Enlarged beyond specifications for the original design, the big boat will have a 51-ft hull and a 130-ft wing carrying radial engines of a horsepower rating still under military restriction.

Arrangements already have been made with public utility companies for temporary removal of power lines for trucking hull and wing from the Hughes factory at Culver City to Los Angeles Harbor, where test flights will be conducted.

Contract Revised—Revision of the Hughes contract to specify production of a single flying boat (The original contract with Defense Plant Corp. called for construction of three boats at a cost of \$14,000,000) will create a radical departure from established engineering procedure in the development of a prototype aircraft of massive proportions.

Under the original contract, specifications called for detailed static load testing of the first boat and finally imposition of destruction loads.

The design now approaching final approval will be test down without extensive static testing. However, the world's biggest flying boat, and largest aircraft employing wood and plastic construction throughout, will be launched with the builder in possession of voluminous assurance of overall strength gained from thorough progress testing of all materials going into the first assembly.

POST-WAR FIGHTERS—Look for a limited post-war modification

of outstanding fighters as personal airplanes for aviation pilots—who have no war work outside. They will be at the \$50,000 to \$100,000 price range. Warplanes potentially attractive to such owners are Northrop's Black Widow and Lockheed's P-38.

Engineers toying with the idea already have spent casual moments contemplating a P-38 stripped of heavy ornament and omitted inaccessibly for pilot and navigator, and with simple luggage room as the nose now crowded with guns.

Luxury plane planners believe, however, that such modifications will be only stop-gaps, that such changes will have their eyes turned to the day when they can buy faster jet-propulsion aircraft.

WIND TUNNEL—Boeing Aircraft Co.'s E. T. Allen Memorial wind tunnel, under construction, has been authorized by the G-6. It has satisfied its designation with a showing of 700 miles per hour at 13,000 of its maximum 15,000 hp.

Whether the tunnel will retain its hold on the claim of being the fastest large tunnel in the world may be tested soon, however, following completion of California Institute of Technology's new wind tunnel, partly financed by Southern California aircraft factories.

While they admittedly are high performance acquisitions of the Caltech project have never been made public.

Outside Groups to Attend NAA Talks

Associations and civic groups that participate have not participated in aviation discussions will attend the National Aeronautics Association's Joint Airport Users Conference at the Statler Hotel in Washington, July 34 and 35.

336 Groups Accepted—Lowell Swenson, NAA manager, and last week that of 72 national organizations invited to participate, more than 30 already had accepted. Invitations were issued to many organizations that may alter the airport picture after the war, as well as those already interested.

Among those who will have representatives are government agencies, transportation organizations, major law officials and other college organizations, construction groups, including road builders organizations, highway users and planning officials as well as aviation specialists in various fields.

B-29 Guns Fired By Remote Control

System is said to make Superfortress the best protected plane in the world.

A revolutionary remote control system is the secret of the great firepower of Boeing's B-29 Superfortress, disclosure of which was permitted by the War Department and followed by announcement of the second B-29 attack on the Japanese homeland.

Armament consists of power towers with multiple gun-installations and with guns sighted and fired by remote control. The system includes computer gun sights which automatically correct for various factors such as wind and plane velocity while putting sights directly on the target.

Greatest Firepower—Because of its supercharged cabin and because it can shoot more long concentrated more accurately at a more distant target than any other plane yet built, the claim was made that the B-29 is virtually invulnerable from attack by enemy planes.

The system was designed by General Electric engineers, requires some 20,000 persons in virtually every G-6 plant to manufacture and construct the largest supercomputer in the company history. G-6 also contributed to the turbo-supercharger developments which built the plane and crew to new altitudes.

Operation Automatic—Under this arrangement, the sight and the gun are separated and the gunners are able to direct gun barrels from control rooms in the fuselage. Details of the system were shown to a selected group of writers, including a representative of AVIATION WEEK at Boeing's Wichita plant last May.

Because of the separation of the sight and gun, a wide choice of locations for both guns and gunners is possible and that arrangement suits a wider range of fire makes possible in addition a heavy concentration of firepower on any selected target. Variability for the gunners for the area assigned to them is easily measured by the remote control system.

Pressurized Cabins—The remote fire control and the pressurized cabins of the B-29 work together. The heated cabins, supercharged to a pressure of about 8.890 feet altitude, maintain that pressure even though the Superfortress may be greatly in excess of that alti-

tude. Location of the gun turret inside the cabin simplifies to a great extent the pressurization problem.

During a flight in the B-29, writers were permitted to station themselves at the gunners' positions, seated comfortably at the side of a large cabin, and observe the guns which provide at least 160 degrees of vision. Instead of working through open hatches as waist gunners had to do in early bomber models, the gunner on the B-29 wears only a light, easily-banded, self-computing sight which controls the guns in the remote towers.

Locations of the multiple 90-caliber machine gun turrets or the gunners have not been disclosed. —C. H. H.

Bellanca Holds 25% Of Voting Stock

G. M. Bellanca, chairman of the board of Bellanca Aircraft Corporation, New Castle, Del., is listed as owning 25.1 percent of the company's voting stock through ownership of 59,900 common as of Dec. 31, 1943, according to the company's report for 1943, filed with the Securities and Exchange Commission.

John H. Jowett, president of Bellanca Aircraft Corp., was paid \$11,442 in salary for 1943, the report discloses.

Millard Goes \$19,413—C. Millard, vice-president and general manager, got \$19,413 during the same period, while S. Samuel Ardit, treasurer and assistant to Jowett, was paid \$18,000.

Compensation paid Jowett and Ardit was for the period from March 23, 1943, when they were elected to their present positions. Jowett's salary is \$12,000, plus 1 percent of the company's net earnings after taxes, and Mr. Ardit's salary is \$12,000.

Sales—Gross sales totaled \$5,422,495. Costs were \$1,311,095, leaving a profit of \$4,111,400. Deductions of \$19,709 for selling and administrative expenses reduced this figure to \$4,091,691.

Giving effect to \$194,315 pre-war order income from various sources, the company's net income was \$973,731. Interest of \$135 on notes payable brought net income before payment of income taxes to \$973,596.

A 10 percent provision for Federal income taxes on the pre-war profits of \$730,900, net income for 1943 was \$242,596.

Northeast Airlines Operates at Loss

Northeast Airlines, Inc., paid its president, Samuel J. Bolcom, \$13,310 salary for 1943, the company's report to the SEC shows. Milton H. Anderson, vice-president, was paid \$12,000 for the same period, and Robert S. Swann, treasurer and director, got \$12,930.

The eleven directors received \$29,030, and \$6,000 was paid to the law firm of Rip, Redford, Thompson & Brown for services.

Revenues—Total operating revenues for the year were \$2,430,380. Expenses totaled \$3,544,338, showing an operating loss of \$643,958. After other deductions such as extension and development costs, interest expense, loss on Canadian exchange and on disposal of capital assets, total loss for 1943 was \$127,861.

There was a claim of \$38,896 for refund of 1942 Federal income taxes based on the carry-back of 1943 loss, which brought net loss for 1943 to \$98,964. Earnings surplus at the beginning of the year was \$43,983, with a deficit at the end of the year of \$53,551. Capital surplus at Dec. 31, 1943, was \$1,490,347.

30 Million V Loan For Minn.-Honeywell

Minnesota—Honeywell Regulator Co. has negotiated a new \$20,000,000 Registration V loan to finance the company's expanded test air production program. The loan is in the form of a term loan and will take the place of the company's existing \$15,000,000 V loan with the new credit available at any time and from time to time until June 30, 1947, subject to earlier reduction or termination of the option of the company. Interest rate is 2½ percent on the amount of monies from time to time borrowed and there is a commitment commission of one fourth of one percent on the portion of the credit from time to time unused.

Syndicate—Banks participating are Northwestern National Bank, Minneapolis; First National Bank of Minneapolis, The First National Bank of St. Paul, Continental Illinois National Bank and Trust Co., Chicago, and four affiliated banks of Northwestern National Bank. The syndicate loan carries a 90 percent guarantee by the War Department.

FINANCIAL

Survey Lists Airline Stockholders Owning More than 5% of Shares

Reports to CAB reveal equities of large companies are widely distributed, whereas ownership of smaller firms is concentrated in hands of few.

General wide distribution of the securities of the large domestic airlines and concentration of control among the smaller lines are the highlights of a survey of stock-ownership reports filed with the Civil Aeronautics Board.

Records submitted to the CAB, showing holders of 5 percent or more of domestic airline securities at Dec. 31, 1943, disclose that two of the "Big Four" companies—Eastern Air Lines, Inc. and United Air Lines Transport Corp.—were the only two domestic airlines that had no stockholders. The latter holder owning more than 5 percent of their securities. American Airlines, Inc., had a stockholder with 28 percent of the company's securities, but the shares have no voting rights. Among the smaller domestic airlines, however, the securities were generally closely held, with many, in many instances, holding the largest stock interest.

► **Cross Ownership Absent**—The study shows the absence of cross-

The accompanying tabulation shows for each of the domestic airlines the holders of 5 percent or more of the companies' securities at Dec. 31, 1943, as filed with the CAB.

Financial Reports

✶ Solair Aircraft Co. reports for fiscal year ended Apr. 30 net profit of \$569,883, equal to \$2.53 a common share, compared with \$512,126 or \$2.52 a share for the previous twelve months. Profit was after federal taxes and nonrecognition refund of \$3,017,397, less a post-war refund of \$267,253 in the 1946 year while net for previous year is after \$3,671,175 federal taxes less post-war refund of \$101,324.

Boeing Aircraft Co.
Reports on Income

P. G. Johnson, president and general manager of Boeing Aircraft Co., was paid \$50,000 during 1943, the annual report of the parent Boeing Airplane Co. to the SEC shows.

Claire L. Egtvedt, chairman, and H. O. West, executive vice-president, of Boeing Aircraft Co., were paid \$38,000 and \$22,500, in 1943.

Legal Fees—The report shows payment to the law firm of Holman, Sprague & Allen of \$53,350 for legal services. Mr. Allen, partner in the firm, is a director of Boeing Airplane Co. Six officers including Johnson, Egtvedt and West, net \$122,764.

Gross sales totaled \$493,188. Other income, such as interest earned, royalty and license fee income, etc., amounted to \$188,541, bringing the total income to \$681,729.

Expense—Cost of sales and other corporate expenses, including depreciation of \$37,540 and \$1,184,097 for amortization of facilities acquired during the emergency period, totaled \$465,538,332. After setting aside \$2,000,000 as provision for contract adjustments, etc., there was a balance before provision for taxes of \$38,843,970. Taxes amounted to \$25,365,006, including \$388,000 for federal normal income tax and surtax, \$234,500,000 for federal excess profits tax, and \$1,000 for state income tax, leaving a profit before federal tax, having a possible carryforward to next year, of \$13,478,970.

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THE AIR WAR

COMMENTARY

Nazis Feeling Effect of Battle Against Strategic War Materials

Concentrated raids on oil sources expected to be reflected in further sharp curtailment within next few months of *Laotians* and mechanized army activities.

Fighter aircraft, roller bearings, petroleum and synthetic gasoline and synthetic rubber. These are prime targets for strategic bombardment.

During the past few weeks the campaign to cripple Germany's striking power by knocking out the production of oil reached a new high. Oil is the lifeblood of the Wehrmacht as well as the *Luftwaffe*. It runs airplane engines, tanks, mobile guns, supply and personnel trucks. Without it German panzer divisions would be immobilized, aircraft grounded, and troop movements stalled.

As a result of an all-out drive during the week ended July 1, the best Allied estimates indicate that Nazi oil production has been cut down to between 30 and 35 percent of the normal output, and that production of gasoline, including aviation and motor fuel, is running at less than 50 percent of the amount needed by the German forces.

one-fourth Diesel and Eight oils, less than a fifth would be heavy fuel, less than one-tenth lubricants, and the balance lost in the refining processes.

Blow to the First Blow—The brilliantly planned and daringly executed low-level mass attack by more than 150 Liberians against the oil refineries at Ploesti was a major blow. Some 25 percent of all German petroleum products were produced here, with more than one-third of the output going directly to the eastern front.

Among the refineries heavily damaged were Astra-Romana, Credint Miner, and Colentina-Aquila, with a combined total of 1,300,000 tons of petroleum products per year. There is no doubt that production was sharply curtailed for several months, while our strategic bombardment forces developed their campaign against fighter aircraft and ball bearing production.

tion in the Balkans, northern Italy, Austria, Hungary and Poland, it was evident that when the battle against oil was resumed it would fall largely to the Fifteenth Air Force of General Baker's Mediterranean Allied Air Forces.

New Hauls in the Spring—As the Russian southern drive across Benarashan and into Rumania progressed, another reason for attacking Ploesti came into the picture. Ploesti was an extremely important transportation center. Thus on Apr. 5 some 325 Forcunses and Liberators dropped over 550 tons of high explosives and incendiaries on both the marshalling yards and the oil refineries at Ploesti. On Apr. 28, in a blow of an entirely different character, some 566 Liberators and Forcunses dropped over 1300 tons on military objectives around Tuzla, including barracks, hospitals, and other

On May 3, another blow against Ploesti oil was struck, this time a heavy attack on the oil pumping station. In addition to distribution by railroad tank car, oil from the Ploesti refineries is carried by pipeline from Ploesti to the Danube, whence it is transported to Germany by barge. May 18 saw one of the heaviest attacks of all, with nearly 1,000 tons of bombs dropped on the Ploesti oil refineries alone.

► Synthetic Oil Plants Attacked—During this same week (May 15) the Eighth Air Force based in England carried out its first major attack on six synthetic oil factories in the Leipzig area which turns out some 40 percent of Germany's total production—Merseburg, Liependorf (4000 tons of bombs), Zwickau, Reus (470 tons), Zeitz,



B-24 USES PARACHUTE FOR BRAKE

When its hydraulic system was shot out during an air attack on Germany, this Liberator crew used parachutes for brakes to land at its base in England. Fastened to the interior of the plane, the chutes were let out the usual window just before the wheels touched.

Ham and Eggs

THOUSANDS of deadly "eggs" have been laid at Adolph Hitler's doorstep by the American Air Forces—"eggs" that made possible our invasion of Europe. And now these "eggs" are falling again on Japan. In this advertisement we pay tribute to the Air Forces personnel who operate the communication equipment of these aerial headquarters—to the radio operators, many of them grown-up "hams."

Without radio—without these gallant flying "hams"—the daring coordination of thousands of planes would be impossible. These men are risking their lives daily so that American formations may communicate with each other, with the ground forces, and with their home bases.

We at Titeflex like to think that we are playing our part in making radio communication possible in aircraft. For high frequency signals from the ignition would completely

blot out radio communication if the ignition system of aircraft engines were not efficiently shielded. We are proud that the Titeflex RADIO SHIELDED IGNITION HARNESS has met and passed the most severe test for electrical and mechanical durability—that of service on America's war planes.

But in the aviation business, today's best is not good enough for tomorrow. That is why the Titeflex research staff is testing, retesting, trying to improve Titeflex products. To meet the need for shielding and flexible tubing of even wider usefulness in postwar aviation is the goal of Titeflex engineers. If you have any problem which these engineers may help you solve, you are invited to consult them now.

TITEFLEX, INC.
560 Frothingham Avenue,
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CRUTCH FOR CRACKED-UP PLANES

Planes that make unconformable belly landings in England are given a "crutch" to get them off runways and on the way back into the air. This British-made catcrutch (read device makes handling of wrecked planes simple and speeds clearing of runways on busy fields.



Bolton (475 tons), results, from hit to explosion, carrying 12,000 pounds, with 50 Lightnings as top-cover. Direct hits were reported as the Romania-American oil refinery, Ploesti, a 1200-mile round trip from Ploesti being down.

A return engagement was played on May 28 when four of the above plants (including 450 tons on Zeitz alone) and two additional synthetic oil factories, Rabbin and Moudberg, were attacked by more than 500 U. S. heavy bombers, with more than 300 determined "beaters" in the Magdeburg area.

These two widespread attacks evidently took care of the synthetic production capacity for the time being, the next such blow being on June 26 when Russian-based bombers of the Eastern Command (USSTAF) struck the synthetic oil plant at Dniepropetrovsk, deep in southeastern Poland.

Atlixak in June—June 6 saw another smashing attack on Ploesti oil refinery (440 tons), while the 10th brought a brilliant and dis-

ing attack by 50 Lightning fighters, each carrying 12,000 pounds, with 50 Lightnings as top-cover. Direct hits were reported as the Romania-American oil refinery, Ploesti, a 1200-mile round trip from Ploesti being down.

The same week recorded heavy attacks on oil stores and refineries at Porto Marghera (twice) and oil refineries at Trieste, both in northern Italy. The following week the 15th Air Force really went after the refineries in Hungary and northern Yugoslavia, with particularly heavy attacks on two refineries at Budapest, on one at Pifford (heavily destroyed), Bony, Duplek and Szek, this was all on June 14. Two days later a series of attacks was carried out against the oil refineries in Austria and Czechoslovakia, with results from good to excellent. The targets included Floridsdorf, Kogern, Leoben, Schwechat and the Vienna Winterthur refineries.

During the same week, in mostly coordinated action, the Eighth Air Force and RAF Bomber Command

added to the destruction. The 8th struck the Mustang refinery near Hanover on the 14th and 18th, and four refineries in Hamburg, besides one at Bremerich in northwestern Germany. The RAF dropped nearly 1,000 tons of bombs on the great synthetic oil plant at Gelsenkirchen in the Ruhr on the night of the 11/12, and nearly 1,000 more on a big refinery near Duisburg on the 11/16.

Shuttle Buses Pay Dividends—On many of these attacks fairly heavy opposition was met, another indication of the necessity for the Luftwaffe to spread even thinner its waning fighter defenses to take care of those widely scattered targets, now so readily accessible as a result of the 3-way shuttle bombing runs—Italy-Russia, Russia-Italy, England-Russia, and other combinations.

During the last week of June and first week of July, bombers from all these bases had another whorl at the crippled system of refineries and synthetic oil plants.

Heavy attacks were made on Ploesti three times within ten days, other refineries at Bucharest, Trieste and Vienna were struck, and (as we have seen) a synthetic plant in Poland was bombed from Russian bases. Besides this, numerous oil dumps were set ablaze.

This is what air power has been able to accomplish against a highly strategic industry, and it will not be at all surprising if the Nazi war machine finds itself running out of gas within the next two or three months.

NAVIGATOR



NEW SAFETY DEVICE:

Photo illustrates a simple device for adjusting the safety harness, lap and shoulder belts, which was designed to meet the request of fliers for a harness that operates with a minimum of effort.



LEADING THE WAY TO VICTORY IN THE AIR—

FLYING HORSEPOWER

TODAY, FLYING HORSEPOWER
IS 100% WAR POWER!

*But think what this kind of
performance will mean in Peace!*

ALREADY tests have shown that a two-cylinder engine, using our superfuel "boosted" by "Flying Horsepower," can achieve amazing performance records over the entire plane using 100 octane gasoline. Here are several comparisons:

TAKEOFF: The transport can leave the ground in less than 1,000 feet, compared to 2,000 feet with 100 octane gasoline in the last test.

CLIMB: The plane can climb over 1,000 feet per minute, compared with 1,400 feet per minute with 100 octane gasoline.

CRUISE: The plane can fly to 10,000 feet, compared to a ceiling of 8,000 feet with 100 octane gasoline.

LOAD: The plane can carry a payload of over 5,000 pounds. This compares with only 1,400 pounds with 100 octane gasoline.

...FUEL OF THE FUTURE

A SENSATIONAL new superfuel, "Flying Horsepower," is providing new power ingredients for America's 100-octane aviation gasolines...boosting the performance of U.S. planes.

This greatest gasoline news of the war is the result of development after development by Socony-Vacuum in Catalytic Cracking. It's the product of 11 years pioneering work...a \$50,000,000 investment in new refining equipment and facilities...the greatest Catalytic Cracking program in the world.

No "dream," no fantastic promise, "Flying Horsepower" is a war-proved reality. Today, Socony-Vacuum is producing enough of this new superfuel every day to provide 100-octane gasoline for 1,300 4-engine bombers flying from England to Germany and return.

After Victory, this "fuel of the future" will power the mightiest air fleets the world has ever known—

FOR TOMORROW'S PEACETIME PLANES!

America's commercial planes. For Socony-Vacuum refineries are ready—the day after all military needs have been met—to start producing for the peacetime requirements of the aviation industry.

Watch for announcements of "Flying Horsepower" in new Mobilgas for aircraft!

NEW SUPER AVIATION OIL HELPS KEEP ENGINES CLEAN!

Drawing upon 75 years' lubrication experience, Socony-Vacuum has developed a new super Mobiloil Aero for aircraft use, to serve as a running-mate for the new Mobilgas for aviation. Right now, this new oil has proved its exceptional wear-resisting qualities. The outstanding feature is its resistance to sludging deposits.

SOCONY VACUUM OIL COMPANY, INC.
30 Exchange, N. Y. C., and Affiliates: Mobilgas
Petroleum Co., General Petroleum Corp. of Calif.



Get the Facts on **Mobilgas · Mobiloil Aero**

Vibrashock

what does it mean?



For years engineers have specified "shock mounts."

These were designed to protect airborne equipment against the shocks of take-off and landing. Conditions have changed, and suspensions which will adequately absorb shock *plus* vibration, are necessary.

Long sustained flight, blistering speed, continuous vibration from high-powered engines, plus new complex instruments have raised a problem. To meet this problem Robinson engineers have perfected VIBRA-SHOCK Suspension.

This new suspension consistently absorbs better than 90% of the engine and propeller vibration in addition to existing shock more than ever before.

Here is one of the many types of Robinson VIBRA-SHOCK Suspension. Today the wide use of this new suspension on our military aircraft protects aerial cameras, radio equipment, delicate flight instruments, and many electronic devices, against shock and vibration—this is VIBRASHOCK!

Robinson

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Converted DC-3's, above, with narrow doors, had to be loaded the hard way. Not built for cargo use, they were pressed into service out of desperation in the early days of the ATC. Right: Lift trucks and a Cessna C-45 Comanche engineered for cargo-carrying have amplified the task and skyrocketed the volume of traffic.



Life in the ATC was often rugged. A soldier on Ascension Island boots out some clothes on a makeshift stove in a makeshift pod.



Air Transport Command: *World-Girdler*



No palatial administration building greeted pilots on Iceland. A humped Mason hut is the briefing room for ATC crews flying the once-a-week Atlantic.



The work wasn't done as fast as it would be in the United States. Native workers mix concrete the old way at an ATC base in Brazil.

REYNOLDS ...can supply vitally needed parts NOW



No part is too small or too large for the complete Reynolds facilities. All parts are subject to rigid inspection as a normal routine of manufacture and shipped with the customer's in-



stantly made machine. Carefully controlled fully checked components insure the highest quality parts. There is no compromise in delay in completing Reynolds parts.

FORWARD-LOOKING MANUFACTURERS recognize their acute need of thoroughly dependable sources of supply in the midst of today's uncertainties and changing conditions. Reynolds is just such a supplier, where aluminum parts are concerned... whether the order calls for the speedy delivery of a few hundred or a million.

These past few years have given Reynolds a post-graduate course in fast, economical parts manufacture. The lack of war "excess" orders produced aluminum parts by the hundreds of thousands... parts of every conceivable size and shape—from small angle brackets and web-pieces to complex wing and cabin segments. Reynolds pre-fabricated aluminum parts lowered the cost and speeded the manufacture of planes, tanks, ships and the thousand-and-one devices that go into these weapons.

Reynolds facilities are complete in every respect... from the basic metal to finished aluminum parts. Batteries of

modern, high-speed machines, manned by skilled operators, are now available to manufacturers with suitable allocations.

Parts can be fabricated to the most strict specifications, or when desirable, Reynolds engineers are ready to work with manufacturers to determine the best application of the new Reynolds-developed aluminum alloys to the specific job at hand. No part is too large or too small for the Reynolds production facilities.

Why not investigate what Reynolds can do for you now? Reynolds Metals Co., Aluminum and Parts Div., Louisville, Kentucky.

SALES OFFICES IN THE FOLLOWING CITIES: Akron, Ohio; Atlanta, Ga.; Baltimore, Md.; Beverly Hills, Calif.; Boston, Mass.; Buffalo, N. Y.; Chicago, Ill.; Cincinnati, Ohio; Cleveland, Ohio; Dallas, Texas; Dayton, Ohio; Detroit, Michigan; Kansas City, Mo.; Milwaukee, Wis.; Minneapolis, Minn.; New Orleans, La.; New York, N. Y.; Philadelphia, Pa.; Pittsburgh, Pa.; St. Louis, Mo.; San Francisco, Calif.; Toledo, Ohio; Washington, D. C.; Wichita, Kansas.

invaluable work, panels, inspection plates, castings and many kinds of similar parts are being produced by Reynolds in large or small quantities.



REYNOLDS

The Great New

ALUMINUM

INGOT • SHEET • EXTRUSIONS • WIRE • ROD • FORGINGS • TUBING • TOOL • POWDER

PERSONNEL

Jack Frost has been named assistant to Lowell H. Swanson, manager of the National Aeronautics Association.



Jack Frost

Frost was formerly a public relations director for several large companies before joining NAA.

V. L. Felle (photo), engineer A. G. Michaels in supervising of Good-



year Aircraft Corp.'s plant 13, where Navy Carrier fighters are produced. Felle has been assistant superintendent of the plant and was formerly of the Arma plant. Michaels had been sent to the Goodyear subsidiary at Leitchfield Park, Ariz., where he became plant manager. The Arma plant has been producing parts for Consolidated B-24s and Venturines and is an important modification center.

Capt. Arthur E. (Mike) LaPore, chief flight officer of First American Army-



Aviation, has been awarded a fifth-year solid service pin. LaPore was the pilot of the first commercial airplane to cross the Atlantic from New York to London and Mexico in 1928. He has served in the Navy at the flight training school at Pensacola.

E. Todd Crowfield has been appointed personnel director of Chicago and

Southern Air Lines succeeding Joseph A. Arner. A former GPA district visiting chief, Crowfield has been general manager of Chicago and Southern's modification center since last Sept. 1. He has been associated with Spartan Aircraft Co., Century Pacific Airlines and the Aeronautics Division of the government.

Howard E. Hefas, formerly with Carl Byer and Associates, has been appointed associated director of public relations for Nash-Kelvinator Corp.

John F. Loughness has been named assistant city traffic manager at Milwaukee for P & W's Central Airlines, succeeding Ellis Jones, who resigned. Loughness has been a member of the Chicago sales staff of United Air Lines. He is a graduate of the Freight Traffic Institute of Loyola University.



R. W. Clough, vice-president of Bel-den Manufacturing Co., Chicago, has been appointed a vice-chairman of the newly formed Aircraft Electrical Council, made up of more than 60



AAF HONORS U. S. RUBBER CO. EXPERT

D. D. Dayton, of U. S. Rubber Co.'s tire division, was awarded the AAF new Civilian Merit Award, given to civilians for outstanding contributions to the war effort. Dayton was attached to Wright Field, AAF Material Command headquarters, as airplane tire specialist. Preserving the award are Capt. N. A. Glantz, chief of the rubber unit, Wright Field, and Ensign F. J. Motowsek, Navy representative.



AA OFFICIAL DIES

Mollie Thompson, 45, a vice-president of American Airlines, Inc., died July 6 in Cleveland. Thompson joined American in 1942 as regional vice-president. He was sent to Mexico later to be vice-president and general manager of American Airlines de Mexico, ultimately becoming president in 1943. This year he returned to the United States to head American's route development program. He was formerly city manager of Berkeley, Calif.

member chairman of the National Electrical Manufacturers Association. Purpose of the Council is to make available to the aircraft industry and the combat aviation forces, the facilities of the electrical industry, including information on



BREEZE SHIELDING CONDUIT

BREEZE MARK

'CLEARING all Wires!'

Breeze Flexible Conduit Shields and Protects Communications and Wiring Systems

Any current-carrying wire in an aircraft electrical system is a potential source of interference with radio communications unless properly shielded. Breeze Flexible Shielding Conduit, produced in a wide range of diameters, can be used in conjunction with Breeze Conduit Fittings and Multiple Electrical Connectors to most positively any shielding requirement.

The custom design of complete radio antenna shielding harnesses is a Breeze specialty, based on years of pioneering experience in the field. Breeze Flexible Shielding Conduit is in service today with fighting units of land, sea, and air, supplementing the many other well-known items of Breeze equipment that are helping the United Nations along the road to Victory.

Breeze BREEZE MARK CORPORATIONS, INC. NEWARK, N. J.

PRODUCTION FOR VICTORY • PRODUCTS FOR PEACE



Breeze Shielding guards communications against high frequency interference from spark plugs and engine system circuits.

trends and changes affecting production and other services.

Edward W. McVey, assistant division manager of the Atlantic division of Pan American Airways, has received a 15-year gold service pin. McVey opened and supervised regular Bermuda flights, and later the trans-Atlantic runs. He joined Pan American as an

apprentice engineer. Last February, McVey relinquished his engineering assignment to become assistant division manager of the Atlantic division where he is second-in-command of the activities of this sector of Pan American's international operations.

Tarnes Bazel, air member for supply on the Canadian Air Council in Ottawa, who has been on loan to the Royal Canadian Air Force, is returning to Toronto to resume his position as mutual general manager of the National Trust Co. Bazel helped set up the British Commonwealth Air Training Plan in 1943.

James A. Reedy, formerly general supervisor of contract administration,



GETS SERVICE AWARD:

United Air Lines Military Training Center at Oakland, Calif., has been awarded the Army's Certificate of Service Award in recognition of the center's training of approximately 5,666 aircraft technicians for the AAF. The certificate was presented to D. L. McDowell, manager of the training center, by Maj. Gen. John F. Curry, in charge of the AAF Western Technical Training Command Military Training Center now formerly known as Boeing School of Aeronautics and since Jan. 1, 1943, has been a division of United.



READJUSTMENT CHIEF:

Col. Ed. W. Renshaw, whose appointment as head of the AAF Material Command's Readjustment Division at Wright Field, was announced in Aviation News last week. Col. Renshaw was formerly chief of the resources control section of the production division at Wright Field. The new division will set up machinery for handling contract terminations, cutbacks, and disposal problems.

He has been named assistant chief of contracts for Consolidated Vultee's Port Worth division. Healy served in the Army Air Forces for 21 years before joining Convair.

Emory F. Gusselke (photo) has been appointed general administrative manager and acting vice president for Remington Aircraft Company, Inc. For many years he has been involved in aviation. Gusselke is 50, and will be 51 on Nov. 1. He was instrumental in the formation of Air Youth of America. He was executive director of the organization until he joined Remington in 1943.

Don Mandell, who has been with Pennsylvania-Central Airlines since 1938, has been transferred from Birmingham to Chicago to serve as station manager there. The re-assignment of Mandell is the result of three airfares resulted in several personal changes at PCA. A. C. Soebe, who has been station manager in Marysville, Ill., Mandell's place in Birmingham and in turn is replaced by E. G. Alvord, formerly chief in Pittsburg.

G. G. Lawless has been appointed assistant to E. G. Alvord, vice-president of General Motors in charge of

the Eastern Aircraft Division and of the Dayton Division. Lawless was with Chevrolet before joining General Motors in 1941. He was with the office war staff of General Motors before his present position.

Barney W. Nelson has been named district traffic manager for United Air Lines at Hartford. He has been with United for seven years. Nelson has served as district traffic manager for the company at Mobile and as manager of center aircraft in United's Chicago traffic office.

Raymond G. Lofelke, treasurer of Pennsylvania-Central Airlines, was recently elected to the board of directors of the District of Columbia Council, Contractors Institute of America.

C. W. (Bud) Gores, recently appointed traffic manager at Chattanooga, was the first employee of Pennsylvania-Central Airlines to return from military service. Gores was formerly a PCA agent at the Pittsburgh station. He flew a B-26 while in the AAF and was recently given a medical discharge. He succeeds Vance Tumbler who was transferred.

Wesley A. Finn has been named division chief of materials at North American Aviation, Inc., succeeding F. F. Evans, who resigned. Finn has been with North American since 1939.

W. A. Armstrong has been appointed chief of materials at Consolidated Vultee's Vultee Field succeeding Basil G. Phillips, who has been transferred to the general office in San Diego as assistant to the director of purchases. Armstrong joined Convair in May, 1941, having been president of Harold F. Rutledge Co., Inc., and J. C. Eno (USA), Ltd. Replacing Armstrong as contract administration supervisor is F. M. Dierling, whose part in production control supervisor was filled by appointment of Robert J. Latham. Myron A. Wieser has been named production control group leader to assist Latham.

Frederick Arthur Zule has been named writer manager at Chrysler's Chrysler St. Charles plant. Zule has held many positions with Chrysler and in 1939 went to England on a large aircraft looking job for the company.

AIRCRAFT PRODUCTION

Industry Asks Aircraft Cutbacks Be Made First in Converted Plants

Spokesmen suggest to Murray War Contracts Subcommittee that cancellations become effective first among temporary manufacturers, such as auto industry, which have post-war markets waiting for them.

Aircraft cutbacks should be effective first for temporary manufacturers such as the automobile industry, which have substantial post-war markets waiting for them, spokesmen for the aircraft industry told the Murray War Contracts Subcommittee of the Senate Military Affairs Committee last week in presenting an integrated program for achieving a balanced production as war needs slacken.

The overriding consideration in the cutback program should be the safeguarding of the creative design staffs of the pioneer aircraft companies. Harry Woodhead, president of Consolidated Vultee, said in outlining the views of the Aeronautical Chamber of Commerce to the Murray Committee.

Urges New Design Be Continued—The termination program should assure that blades of new design, in

production or projected, be continued if in the opinion of the Army or Navy they are needed for the maintenance of air power. Mr. Woodhead said he urged also that the program include continuation of development of experimental types that will contribute to advancement in the sciences, complete termination of types of which there are excess quantities and of types which are no longer of tactical value.

The program also should be so designed as to prevent precipitous and continued wholesale unemployment and should provide employment in non-war industry in proportion to decreased employment in war industry, Woodhead said.

Factors to Be Considered—The AACC program suggested that the following factors be taken into con-

sideration in formulating cutback programs, in addition to the primary factor of post-war markets: Problems of the creator of the original design should be given consideration in the decision as to which manufacturers are going to be cut back first—the licensee or the basic manufacturer.

Present production status of the manufacturer concerned.
Local manpower situation.
Overall costs of the products to the government.

Manpower utilization.
Meeting of production schedules.
Contributions to the progress of aviation.

Needs of the aircraft industry to prepare for post-war development and production.

Orders for aircraft that are becoming obsolete should be cut back before orders for aircraft of more advanced design, and of greater tactical usefulness.

Woodhead pointed to the need for coordination between the Army and the Navy in cutbacks, and suggested that advance notice be given in time to meet with the 90 to 120 aircraft manufacturing cycle. This should provide sound economy to the government and aid in the solution of the problem of losses of workers hard to replace and the evaluation of work in process for estimations of termination costs, he said.

Cutbacks, Mr. Woodhead emphasized, should not interfere with future production of types of aircraft still in demand by the military,



CONSOLIDATED'S NEW TRANSPORT:

The Model 30, post-war conversion transport version of the famous Liberator bomber, built by Consolidated Vultee, is shown in this new photograph during a recent test flight.

particularly where the outflow will upset the labor resources of the company involved.

Job Insurance—Mr. Woodhead said the aircraft industry is in thorough agreement with the principle of adequate unemployment insurance as an essential to orderly manpower depollution and re-employment, together with retraining of workers going into other fields by new employers or educational agencies and transportation of workers at government expense to new jobs or to their home communities. Half-funding of workers by new employers or educational agencies is suggested.

The demobilization problem is one of national economy as a whole, he said, pointing out that the aircraft industry is not financially in position to assume additional burdens over and above those already borne that will force the industry on termination of war contracts.

Navy Chiefs See New F-7-F Perform

Flies its first solo-engine fighter and in top Helio in speed and climbing ability.

The GRUMMAN F-7-F, the Navy's first two-engine fighter, a plane of high speed and power, has been demonstrated before Assistant Secretary Arthur L. Gates, Rear Admiral A. W. Radford, acting deputy chief of Naval air operations, and other ranking officers in the first public showing of the craft.

Details of the performance are still restricted, but the observers who watched Comdr. Joseph G. (Jumping Joe) Clifton put the F-7-F through its paces were obviously impressed. The new plane, as yet unnamed, is powered by two big Pratt & Whitney engines and its take-off and landing characteristics were termed remarkable by the Naval observers.

Faster Than "Hellcats"—An indication of its speed was given when the F-7-F easily caught and overtook Hellcats, one of the fastest fighters which is known to be in the 600 mph class.

The F-7-F is reported to be an outstanding climber. The pilot pulled the plane from level flight to an angle that was nearly vertical and continued the climb for some seconds, literally hanging on the propellers, in the midst of other maneuvers which indicated ease of handling.



REPLACES TURRET:

This new tail endevor has been devised at the Advanced Base Aviators Training Unit, Norfolk, for the early model F2M-3 Marine patrol bombers which are now being converted to corps transport. The new endevor replaces the tail turret on the combat version, and is used as a navigator's station. Entrance is provided both through a top hatch and from the rear compartment of the fuselage.

Plane Firms Aided By Canadian Budget

Canada's new financial budget provisions are expected to benefit Canadian aircraft companies along with other Canadian corporations. Under the new provisions, which have post-war significance, companies will be able to borrow on the 20 percent refundable part of the 100 percent excess profits tax. This refundable portion is to be repaid after the war.

Provisions—Loans in any year may now be charged back one year or forward three years for corporations or various profit losses. Companies are granted double depreciation on new capital investment after a date to be set by the government, may write off expenditures on scientific research directly or indirectly connected with the business, and half-expenditure for maintenance and repairs in a period to be fixed may be allowed against income of previous fiscal periods in computing corporation and various profits taxes.

Benefits—Plane Manufacturers—While no final ruling has yet been made on what are standard profits for Canada's airplane manufacturing plants, the proposed financial

legislation is expected to benefit the aircraft manufacturers who have been faced with the possibility of some of their wartime revenue going into taxes, since no airplane firm in Canada was a big industry before the war, except those connected with shipbuilding, munitions or other heavy industry.

Buick Hp. Output Passes 60 Million

Total aircraft horsepower manufactured by Buick division of General Motors has passed more than 60,000,000 in 30 months of war production with the production of the 50,000th Liberator bomber engine.

Output is currently at the high rate established last year when the Buick plants in Flint, Mich., and Melrose Park, Ill., reached full operations in accordance with the production schedule laid down by the AAF Materiel Command and the WPB and will continue at this pace, according to present plans.

Buick Retooling—While maintaining this schedule, Buick is retooling for the manufacture of two new engines of greater horsepower and improved performance, one of which will replace present production for the Liberator and the other to power the four-engine Douglas C-54 Skymaster transport. Both new engines are of Pratt & Whitney Twin Wasp design, which Buick manufactures under license.



Buick's 50,000th—Within a month after Pearl Harbor Buick produced its first Liberator engine and within a month after D-Day the firm manufactured its 50,000th Pratt & Whitney engine shown here with Harlow H. Carnice, General Motors vice-president and Buick chief executive.



REHEARSING FOR THE AIR-LANES OF TOMORROW

In Europe, in Asia, in the South Pacific... on battle fronts around the globe... American pilots are fighting to Victory. Thousands of these air heroes win their wings in Ryan PT-22's... at Ryan flying schools.

To get these superb military pilots trained right, Ryan has been privileged to conduct a most extensive flight-training operation for the United States Army for nearly five years.

Daily, Ryan Schools at Hemet, California, and Tucson, Arizona, fly a distance equal to ten days around the world. Hundreds of seasoned pilots, men and

women skilled in maintenance, and technical experts make the Ryan Schools a smooth functioning operation experienced in the operational problems which must daily be met to keep such a large-scale project operating at peak efficiency.

Ryan Schools, with more than 20 years of active flying experience, are also, in effect, operating laboratories for the aircraft designers of the Ryan Aeronautical Company. They are instrumental in bringing new and improved methods to flying operators and better ideas on streamlined maintenance.

FIRST IN THE U.S.—Since 1935, modeled the first year's flight program as that of the United States. This year's first flight program is based on the principles of Ryan PT-22's and is the most advanced and complete of any in the world.

RELY ON RYAN TO BUILD WELL



RYAN SCHOOL OF AERONAUTICS SAN DIEGO, CALIFORNIA
DENVER, ILLINOIS, HEMET, CALIFORNIA, AND TUCSON, ARIZONA
THE RYAN SCHOOLS ARE SUBSIDIARIES OF THE RYAN AERONAUTICAL COMPANY

U.S. Tests Plan to Absorb Loss on Company-Owned Surplus Stocks

Materials will be sold to the government for \$1 and adjustments made in renegotiation and tax proceedings under program being tried out.

Agreement with government agencies on a plan whereby company-owned surplus materials will be sold to the government for \$1 and company losses absorbed in renegotiation and tax proceedings was reported last week.

No formal agreement has been made, but a test proceeding in which the principle will be established is now under way. Its completion along lines already agreed on will clear the way for industry-wide operation of the plan.

P-40 Percent Tied Up. It is believed that 30 percent of all aircraft material surplus is tied up because it is company-owned and not government-owned, and that the projected plan will remove over half of this 40 percent.

Meanwhile, the first shipment of excess inventory materials under the warehousing plan has been made from the Republic Aviation Corp. plant at Farmingdale, Long Island, and as additional stock of materials will start within a week at the Bell plant in Buffalo, and the Intestate factory in California.

Revelation. The benefits of the suppression of surplus materials, other than preparation for shipment to warehouses were shown in the Republic plant when at the last materials before shipment was to have started two weeks ago, an upward revision in the P-40 production program meant that some of the excess would have to be used. Segregation of the materials enabled the plant to stall the needed materials from the surplus stockpiles and delayed movement of the balance to warehouses for only one week.

Fifteen warehouses have completed contracts for the excess materials program of the 39 expected to participate in the plan, it was learned. Other contracts are in process and should be ready by the time a heavy volume is moving from the aircraft plants.

P-10B Florida Cavalry Job. One hundred twenty-nine aircraft plants of 400 eligible under the program have fully completed negotiation and reports on the excess materials, and are ready to move

surplus goods as soon as arrangements are completed. Complications in the system are being ironed out through the virtually experimental transfers from Republic and Bell, and as soon as it is determined that the process is working out as projected, the movement of materials will be speeded up considerably. The volume of excess inventory is running as high or higher than anticipated—well more than \$100,000,000 for the country's aircraft plants.

Efforts of individual plants now will be concentrated on materials other than those included in the warehousing plan. Going to the warehouses are aluminum, steel, copper and hardware of various classes, since these lend themselves more readily to warehousing and are relatively fast-moving items. Other goods will continue to be marketed through surplus disposal units of the individual companies.

—W. G. K.



TECHNICAL ADVISER:

Opie Chenoweth, technical adviser to the AAF Materiel Command's materiel laboratory chief at Wright Field, has been developing engines for the AAF for 21 years, having started with the overseas production of Wright Field's predecessor. He was an important contributor to development of the peacetime supercharger, and was a peacetime recipient of the Mosby Memorial medal in 1928.

1944 Engine Output To Top 4 Billion

Dollar volume estimate based on scheduled production of 277,871 aviation power plants for year.

Total dollar volume of aircraft engines to be produced this year is estimated at \$4,564,201,890, based on a scheduled output of 277,871 engines for 1944, according to the Aeronautical Chamber of Commerce.

For the first five months of this year, 113,338 aircraft engines were produced with a total dollar volume of \$1,623,352,000 and for the rest of the year 164,533 engines are scheduled with an estimated dollar volume of \$2,940,849,890.

Production for the first six months and estimates for the last six months, as reported by the Chamber, shows:

Month	Engines	Dollar Volume
Jan.	22,076	\$213,640,000
Feb.	23,347	\$246,350,000
Mar.	29,886	\$345,540,000
Apr.	26,605	\$281,077,000
May	28,617	\$308,611,200
June	28,022	\$311,317,000
Estimated:		
July	22,845	\$289,800,000
Aug.	24,361	\$300,776,000
Sept.	21,368	\$275,950,000
Oct.	23,817	\$303,680,000
Nov.	21,864	\$282,260,000
Dec.	22,063	\$274,791,200

It was pointed out that the estimated schedules are subject to change with changing tactical requirements and that both numbers of engines and dollar volume would be revised accordingly.

4,000 Hp. Next

Engines of 4,000 hp are indicated for the future with the building of eight new production test cells at the Pratt & Whitney plant of Pratt & Whitney Aircraft Division of United Aircraft Corp., capable of handling engines up to that size.

The new cells are being built for quantity production of already announced models of horsepower greater than the 3,000 hp engine now handled in the more than 60 production test cells at the P&W plant, but with the greater capacity should it be needed. Forward planning led to the preparation for tests of units up to 4,000 hp, according to William P. Gervais, P&W general manager. The new units are 18 feet in diameter in the test sections.

PRIVATE FLYING

Embry-Riddle Plans Expansion But School Remains Main Interest

Organization, which started with single seaplane in 1939 and grew to eight divisions, announces intention to enter other fields, including plane sales and feeder line operations.

By BLAINE STUBBSFIELD

Aviation training will remain the primary interest of Embry-Riddle School of Aviation, Miami, Fla., according to executive statement, although expansion into other fields is contemplated.

Purpose of the school, which started with a single seaplane on the MacArthur Causeway in 1939 and grew into eight divisions, was to provide thorough aeronautical training in all phases from the ground through the air, and this policy is being maintained.

Capacity Operations.—Today, with maintenance shed, both the seaplane base and Chapman Field, the landmark base in Miami, are operating at capacity. Civilian, coming from all over the United States to take advantage of Florida's climate and four flight hours, are getting their wings at Embry-Riddle along with WAVES, Navy cadets, Air Force officers—all studying on their own time. Flight instruction will continue as an important part of the school's operation in the post-war period.

The technical division, housed in an eight-story building containing 170,300 square feet, originally designed as a hotel, serves one of the finest physical setups in the country, officials say. All the ground courses, including aircraft and engine mechanics, drafting, radio, instruments and Link training, run for 10 months.

10 Month Course.—Embry-Riddle is now developing a complete 10 month aeronautical engineering career course for instruction of returning war veterans and for civilians in peacetime.

The school expects to play a similar role in the nationwide veterans' rehabilitation program, and today is arranging courses, instructional staff and accommodations to take care of a large number

of these men. Here, too, the Florida climate is expected to play an important part, enabling veterans to regain their health rapidly at the same time that they are preparing themselves to return to positions in civilian life.

Outstanding Job.—The engine, aircraft and instrument divisions of Embry-Riddle performed an outstanding job for the Army Air Forces during a period when speed and production were of the utmost importance. The instrument division, for instance, assembled approximately 15,000 instruments of all types for the Air Force, while more than 3,000 major engine overhauls were performed by the engine division.

Miami is already an important air center, and seems destined to expand so much in the future; there will be a constant need for servicing, maintenance and overhauling of civilian aircraft and the Embry-Riddle management says it will be ready to face that demand with the same shops and equipment that have been servicing the Army during the war.

Sales and Feeder Line.—Other post-war plans which Riddle says were being investigated by the school as possibilities include operation of a sales division for planes and parts and operation of a feeder plane line.

Under the school continues to train thousands of cadets for the Army Air Forces at Campiers and Durr Fields in Anacostia, Fla., and RAF schools at Riddle Field, Cleveland, Fla., in addition to operating its Miami division. In San Francisco, Riddle is operating the Brazilian Technical School of Aviation for the Brazilian Air Ministry, training aviation technicians for the Air Force, the Army and the Brazilian aviation industry.

Geuting Asks Easier Rules for Flyers

Tells Murray Subcommittee that worked opera in private flying will follow relaxation of strict regulations.

The right to fly, in many respects, has been taken from the personal flyer and a state and sensible relaxation of regulations and restrictions is needed if private flying is to assume its rightful place, Joseph T. Geuting, vice president of General Aircraft Corp. and spokesman for the Federal Aircraft Council of the Aeronautical Chamber of Commerce, told the Murray War Contracts subcommittee of the Senate Military Affairs Committee last week.

A new point must be taken by the law and the administrative agencies of our government if the public is to reap the benefits that personal flying makes possible, Mr. Geuting told the Murray group. Asks Relaxation of Rules.—Geuting predicted that personal aircraft would take an important place in the post-war picture if regulations are relaxed and if landing and takeoff facilities are provided for



PRISMS EXTEND LIGHTS:

Technicians at Civil Aeronautics Administration have developed this plastic extension rod to divert runway marker lights at northern airports where snow covers the standard, flash type installations. A prism at the top of the rod directs a beam of light each way along the runway, refracting it from the regular set built at the base.

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Flight Possibilities . . . Models
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HIGH SPEED PRIVATE PASSENGER PLANE
FEATURES—DUAL ROTATION PROPELLERS—
POWERED BY LIQUID COOLED ENGINE—
LANDS ON THREE RETRACTABLE WHEELS—
ACCOMMODATES FOUR PASSENGERS & LUGGAGE



Executive or sportsman may find his dream mix of safety in this remarkable streamlined plane designed for 100 m. p. h. cruising speed. Superficially it will compare to little popular as its design and will have an electric "eye" to indicate a clear line of flight. For the sportsman pilot, it

Proven by various achievement in aircraft, men will want to fly farther and faster in peacetime periods. To fulfill their desires, efficient designs for private and commercial airplanes are already taking shape.

Contributing substantially to past progress in aircraft

has been Fafnir's success in engineering friction out of aircraft controls and engines through the development and production of specialized ball bearings. Millions of Fafnir Ball Bearings in America's great airplanes furnish convincing proof. Continuing its 35-year close associ-

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tion with aircraft engineers, Fafnir will provide the ball bearings to free power and control from friction in almost of tomorrow. It's as simple as on any moving rotary part — there'll be a Fafnir for it! The Fafnir Bearing Company, New Britain, Conn.

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the personal flyer. He explained the Personal Aircraft Council's program for a suitable number of facilities, and pointed out that the industry was not seeking federal help in this program. He outlined the "Airpark," "Flight-shops," and "Air-Harbors" plan whereby communities and states would assume responsibility for construction and maintenance of these relatively inexpensive facilities.

But even these will not be sufficient unless changes in regulations make flying far personal use more attractive, he told the committee. Civil Air Regulations now are a deterrent to volume production of personal aircraft. Creating maintenance, saying that "the industry feels that regulations of personal aircraft and the personal pilot has grown through the years to the point where present regulations impose serious burdens which make the pilot reluctant to fly and impose additional and unnecessary costs on the flying public."

- He suggested:
 - ▶ That personal flying be covered in separate legislation that would remove the air spaces available to all persons wishing to travel;
 - ▶ That these spaces be placed under federal jurisdiction;
 - ▶ Ownership and operation of airplanes should be put on the same basis as that of ownership and operation of automobiles;
 - ▶ Permit piloting of aircraft following proof of reasonable skill, and permit flight in a straight line from any point without clearance, flight plan, permission or report except along commercial airways under instrument conditions
 - ▶ Freedom to Private Owner—Regulations should be drafted so that airplane owners would bear no greater burden than the automobile owner

A pilot would receive a pilot's license with no greater relative difficulty than in securing an automobile driver's license.

A "learner's permit" would be granted to students without undue formality.

No medical or physical qualifications above those of major importance would be required.

Any individual holding a pilot's license could give instruction provided he does not do it for hire. Bonuses "have to give the confidence and good will of the small town people in his territory, and his own keen personal traffic know-how."

Effective Territories—Col. Henry A. Berliner, chairman of the board of

Engineering and Research Corp., also testified before the committee, urging that personal plane manufacturers be permitted to begin the manufacture of parts for small planes now so that production could start within one or two months after the close of the war instead of six months later. He explained that this company would not fear competition from surplus planes.

Ballard to Enter Aviation After War

Plans for a post-war automotive service in the field of interior engineering, designing and decoration as applied to airport buildings, airports, airports, airports, airports, airports are being made by the Walter M. Ballard Co., whose personnel and facilities have been assigned to Ballard Aircraft Co., Inc., since 1942.

Will Enter Aviation—The company is now engaged in manufacture of aircraft and aircraft parts for the armed services and plans to enter the civil aviation field after the war when materials and equipment will be available. The firm has long been engaged in interior engineering, de-

signing and decorating various phases of manufacturing although it has specialized heretofore in the interior design of restaurants, hotels and public buildings and has manufactured furniture and appliances.

Officials said the decision to enter the aviation field was made after extensive surveys.

Canadian Air Force Halts Recruiting

Recruiting for all branches of the Royal Canadian Air Force has been halted to Oct. 1, with diminishing enemy strength and reduced RCAF casualties given as the reason. The action follows closely action of the AAF and the Navy in cutting back pilot training. Canada announced at the same time that training courses would be extended by eight weeks, which would enable the RCAF to give more advanced training in Canada. The U. S. Navy likewise extended its training period coincident with a cutback in pilot recruitments.

Manpower—Due to plentiful supply of pilot material in Canada, only those who showed the greatest aptitude will continue their pilot training. The suspension of recruiting would avoid withdrawing additional men and women from the manpower resources of Canada "at this critical time," according to the announcement.

Snyder Buys A.I.D.

Snyder Aircraft Corp. of Chicago, which recently acquired A.I.D. Inc., at Denver, will combine the Denver operations with the present Chicago and Columbus activities.

The expansion was undertaken to serve an expected larger new group of private plane owners and fixed base operators with a line of engine parts, accessories and aircraft supplies, together with overhaul and repair service at the Denver branch.

High School Aviation

The Aviation Division of the Florida State Chamber of Commerce, at the suggestion of Macdonald Reyer, public relations coordinator for National Airlines, at Jacksonville, has voted to ask the State Education Board to make aviation a part of state-wide high school year-round instruction.

TRANSPORT

ODT Asks Cut in Air Priorities In Move to Ease Congestion

Also suggests complete review of airline advertising with view to deterring rather than encouraging plane travel, in letters from ODT Director J. M. Johnson forwarded by ATA President Goerrell to airline officials.

By MERLIN MICKEL

Office of Defense Transportation, in a double-barreled assault on the vexatious problem of congestion in airline traffic, has called for reduction in air priorities in favor of non-priority transportation and suggested a complete review of airline advertising lest it encourage rather than deter plane travel.

Copies of both letters, which were signed by ODT Director J. M. Johnson, have been sent to the heads of airlines, traffic and sales executives by Col. Edgar S. Goerrell, president of Air Transport Association.

Left Up to Army—That dealing with priorities was addressed to Robert A. Lovett, Assistant Secretary of War for Air. Although ODT is responsible under presidential edict for air transportation as well as other forms, administration of the priorities system has been left to the Army because of its facilities for the job.

Asking whether the priorities are being considered strictly in accordance with the President's memorandum of May, 1942, Johnson expressed apprehension that strict limitations suggested by the President "have not been followed in all cases," and the belief that "the present situation justifies a careful review of present policies."

Eases Non-Priority Needs—"A substantial reduction in the granting of priorities for air transportation," Johnson wrote, "will, of course, proportionately increase the space available to the airlines for non-priority transportation, which is so badly needed at the present time."

The director also was glad to note that additional planes were being released to the domestic airlines.

His letter to Goerrell and Chair-

man L. Welch Pope, of the Civil Aeronautics Board, on airline advertising followed discussions of the passenger situation with railroad men who "referred critically to their competitive disadvantage, as a result of current airlines' advertising," of which Johnson attached specimens to the letter to Pope.

Asks Review of A.D. Practices—"Although I understand that the rules of the Air Traffic Conference over advertising practices," the director wrote, "I am not persuaded that the attachments addressed to this agency... in any event, under current conditions, I

believe that advertising practices of the airlines should be completely reviewed... It seems to me well to call the attention of the airline industry to the desirability of their conforming to their agreed advertising restrictions and likewise to review the advertising agreement to see if it meets the tests of present sound public policy, which, in my opinion, is to deter travel."

Problem for Railroads—Johnson pointed out that the railroads had been asked to discourage traffic-crowding and stimulating and competitive advertising, and commented that during the past two and a half years their record in this regard is "unsatisfactory." But "naturally they grow restive when they are airlines apparently balking for business."

ODT has evinced particular interest in the airlines since as long as last January. The then director, Joseph B. Eastman, prompted by the Truman Committee report urging that additional planes be turned back to the airlines, wrote Lovett and Civil Aeronautics Administrator Charles I. Stanton asking their observations. For reasons which had seemed sufficient to Jan. 21, when the letter was written, ODT had not concerned itself with operational problems of the domestic airlines. But Eastman, who since has died,



STANTON IN CALIFORNIA:

Civil Aeronautics Administrator Charles I. Stanton, (left, seated), conducted his first inspection tour of California recently at Santa Regina Headquarters of the CAA in Santa Monica. At Stanton's left is H. A. Hook, South Region manager. Standing, left to right, other South Region officials are Arthur Johnson, superintendent of airports, Harold Bromberg, superintendent of air training, George Hammond, administrative officer, James Reid, superintendent of safety regulation, and R. W. F. Schmidt, superintendent of airports.



PCA STATIONS GET FIRST AID KITS:

The first 34-211 emergency kits specially designed for Pennsylvania-Central's ground stations are shown above being presented by Sam Miller, PCA safety director, to station employees. The kits were designed by Dr. L. G. Lederer (extreme left), and contain all the necessary items for administering first aid.

aid the position taken by the Senate committee prompted him to seek comment.

► **Kalamazoo**—Papers, to whom Station forwarded the inquiry, replied that the airlines did not have "anywhere near the number of aircraft required to handle the vital war traffic offered." He said the Board estimated that additional craft required by domestic and international flag carriers this year would include 93 to carry essential priority traffic without substantial displacement, 152 were estimated by the carriers as needed to carry war traffic adequately, and 150 was the Board's estimate on the additional number required to

transport normal traffic at normal utilization and load factors.

Garnett subsequently received these estimates. Writing the CDT late in April, he commented that "more priority passengers are being displaced now than ever before," and said the trend seemed to be continuing as priorities were granted in increasing numbers without proportionate increases in equipment.

His memorandum to the airline heads, accompanying CDT's latest communications, declared that "the quantity of planes currently being purchased was 'greatly influenced' by the CAB estimates, although planes are not yet being made available to the airlines on any estimate of equipment required for normal traffic transportation.

Priority Load

The Army has been criticized increasingly for too indiscriminate granting of air priorities. The CDT letters may bring about some change already been taken as a check. Recently the system whereby government agencies had a certifying official who could issue priorities directly was eliminated, and such priorities are now processed like others through Ropes, the registered air priorities office. Return of planes also has brought some drop in priority load factor, although in some instances normal flights, such as those from Chicago, Kansas City and Dallas, it still runs about 95 percent.

west, Continental's shops met the usual February quota by working a 34-hour, 3-day week for over a month. Production schedules have been set through September. The planes come from Boeing factories at Wichita, Kansas, and Seattle.

Personnel at the Denver plant has been jumped 35 percent to handle the work. During March, 75 Continental technicians were sent to army base to make certain additional changes in the planes.

Two of the airline's pilots have been checked out to handle the Superfortresses.

Hawaiian Airlines

Asks Link to Orient

Applicants filed with CAB seek to connect islands with Philippines, Japan and China.

Hawaiian Airlines, Ltd., moved last week to become an international as well as a trunk carrier in an application filed with the Civil Aeronautics Board for routes connecting Hawaii with the Philippines, Japan, and China.

The China route is laid out via Midway Island and Tokyo, with Shanghai as terminus.

► **Alternate Routes**—Two alternate routings link Honolulu with Manila, one via Wake Island and Saipan Island, and the other via Johnston, Ponape, Marshall, Truk and Palau Islands.

Combined with the Honolulu-California routes already applied for these links would give Hawaiian a coast-to-coast Pacific route. A permanent certificate to authorize scheduled mail, passenger and express service is asked. Hawaiian plans to use four-engine land-planes in operating the routes.

► **Interlinking Relationship**—Western Air Lines filed jointly with five of its affiliates for approval of interlinking relationships resulting from the recent acquisition of Island Air Lines and the subsequent amalgamation of Western offices to comparable positions with Island. The applicants for approval include L. H. Dwyer-Smith, Charlie N. James, Thomas Wolfe, Paul E. Sullivan, and J. J. Taylor.

North Central Airlines, Chicago, Ill., applied for a permanent and/or temporary certificate to authorize scheduled mail, passenger, express and cargo service over 16 routes in Michigan, Illinois, Wisconsin, Iowa, Minnesota, and North and South Dakota.

► **Mexican Router Service**—Wil-

son Bestas, Naples, Aetn., added a certificate for a mail, passenger and express feeder service along the U. S.-Mexican border between San Diego, Calif., and Brownsville, Tex. He operates the International Airport at Naples. The application states that Bestas owns two Fairchild 24s, is purchasing a Waco custom type ship, and proposes to acquire four twin-engine Beechcraft or Cessna's. He disclosed that he is ready to invest \$30,000 in the enterprise.

Food Shipments

By Air Studied

Cost peribles may be plane in test of feasibility of program.

Difference of opinion as to whether the future of air transportation of perishables lies with the established airlines or with contract carriers appears to be developing as researchers begin their study of this type of commodity and its adaptation to air travel.

In one quarter studies were being made by major trunk operators, one of whom began experimental carriage of West Coast fresh to the East for a university experiment. In another a leading exponent of such transportation suggested "trump steamers at the air" as possibly the best experiment.

► **Taste Tests Conducted**—At Detroit, a panel of 32 food experts conducted taste tests last week of the first perishable fruits sent from the West Coast to Wayne University as part of a new experiment to determine what value such shipments may have after the war.

The shipment started a research program on air shipment and merchandising of such items, in which the university, United Air Lines, and the Great Atlantic & Pacific Tea Co. are cooperating.

► **Food Samples**—Under supervision of Dr. Spencer Larnen of Wayne, 100 fruit and vegetable samples, apples, peaches, pears, lettuce, apricots, peaches, strawberries picked less than 48 hours earlier. Officially results were not made known, but J. P. Brennan, chief of the state department and Earl R. French, national marketing director of A. P.'s produce affiliate, said they were "extremely favorable."

The first shipment, non-priority like others to come, was flown from San Francisco. Shipments are to be made once a month, for



Study Perishable Cargo Possibilities: One of the early studies of retirement or movement of perishable and manufactured goods is being conducted by Evans Transportation Research. Here the latter is being discussed by (l. to r.) William A. N. Burden, Assistant Secretary of Commerce; Edward S. Evans, Detroit industrialist and authority on loading; and Secretary of Agriculture Claude R. Wickard.

a year or more. After each, flavor, appearance and condition will be checked against those of the same items sent through usual market channels. The comparison will extend to laboratory studies for vitamin and sugar content, deterioration and weight loss.

► **Other Studies Under Way**—As this study was developing, another by Edward S. Evans Transportation Research, in collaboration with the Departments of Agriculture and Commerce, was well under way. Here investigations are looking into the possible use of surplus war transport planes for peacetime contract carriers in part of their studies of improved movement by air of perishables and manufactured goods.

Founded by Col. Edward S. Evans of Detroit, industrialist and leading authority, who made a grant for air cargo research to Wayne University, the study also has the cooperation of the United Fresh Fruit and Vegetable Association and Detroit Board of Commerce. Findings are to be made public periodically.

► **Looks Both Ways**—Currently the investigation deals with east-bound air movement of such perishable as lettuce from the Pacific Coast and the return haul of Detroit manufactured products Evans

expects it to indicate whether the best interests of consumer, producer and manufacturer, will be in fact operation by contract carriers—"trump steamers of the air, able to go where business lies."

Evans welcomed private research by various airlines, but did not feel that the public interest required studies along broader lines regardless of the nature of the carrier—air, rail, truck or marine. His group will work with all airlines, including those who have undertaken their own research, in an order depending on commodities and geographical centers.

Col. L. H. Brittain, founder of Northwest Airlines and now recently consultant for the Aeronautical Chamber of Commerce and Wayne's war cargo research, is director of Evans Transportation Research Headquarters in Washington.

Warmer Names Aide

Recently appointed assistant to Vice-Chairman Edward Warner of the Civil Aeronautics Board is Melvin A. Brenner. He replaces Mrs. Hope Appel Brenner in a position at City College of New York, and a former War Production Board economist.

ATA Studies State Legislation Plans

See-point program recommended by committee for adoption in industry policy.

Six points on state aeronautical legislation have been submitted to the Air Transport Association by the State Relations Committee with the request that they be adopted as industry policy.

Based on recommendations by a subcommittee, they were approved by a plea that ATA's board of directors instruct the committee by Sept. 1 so that it may prepare for its work next year, when 44 state legislatures hold regular sessions, 48 starting in January.

Report.—The proposed industry policies were contained in a detailed report by a subcommittee composed of Russell Campbell of TWA, chairman of the State Relations Committee, and W. J. Moulton, Jr., of Continental.

Briefly, the six points are as follows:

State Regulation of Interstate Operation of Airline Carriers.—

New duplicating and unnecessary and will prove harmful to development of air transportation and public interest. State regulatory and jurisdictional powers should not apply to interstate air carriers.

Taxation of Aeronautics.—Equitable taxation is vital to development of aeronautics. Aviation fuel taxes and special taxes such as income and excise taxes should not be imposed. State aviation taxes should be allocated exclusively for aviation purposes and primarily redistributed to the benefit of education.

Airports, Airport Zoning and Air Navigation Aids.—State regulation of airports and such items as zoning, local revenue, navigation aids, etc., should be uniform.

Terminology, standards, rates and application.—Consistent with Federal regulations and standards.

Enabling Legislation for Municipalities.—Local governmental subdivisions can best achieve creation and development of airports and flight strips. Legislation to authorize zoning and exercise of eminent domain as to airports and flight strips should delegate responsibility to local political subdivisions.

General Laws.—When applicable to aviation, state laws should be clearly defined and uniform throughout the nation.

Educational Work and Public Relations.—



SETS FLIGHT RECORD:

Dated Air Lines cleared a flight record of 7 hours and 18 minutes between Anchorage, Alaska, and Portland, Ore., established recently by Capt. Robert Squires (above) piloting a C-47 under United's Air Transport Command Alaskan contract operations. The plane carried patients destined for an Army hospital in Vancouver, Wash.

Business Progress.—Should be aggressively and consistently assisted by the industry to obtain the most practical state laws important that early consideration be given development of an air carrier legislative organizational program by states, including active participation and acceptance of responsibility by all air carriers in the industry.

Resale Formulas

Price formulas for determining resale prices of DC-3 type aircraft to the airline have been adopted but to date none has been satisfactory to those representing the purchaser.

One was recommended by the Civil Aeronautics Board May 8, M. Weld, of the Missouri Council at Wright Field, proposed another, later modified it, and now proposed a simpler one.

Major Weld's latest proposal would fix a standard basic price of \$17,000 for all planes of this type. As a credit against the basic price, a maximum of \$45,000 would be allowed for the cost of restoring each individual airplane to airline operating condition and standards.

Top Air Transport Association officials were reported in discussion of the matter last week with high Army officials.

CAB Examiner OK's Hughes TWAControl

Tool company's holdings of airline stock found "not inconsistent with public interest."

A Civil Aeronautics Board examiner has recommended that the Board find the relationship existing between the Hughes Tool Co. and Transcontinental and Western Air as "not inconsistent with the public interest."

The proceeding grew out of an application by Hughes Tool Co. for stock approval necessary because of the \$40,000 share of 45.6 percent of TWA stock it holds. Howard R. Hughes is the sole owner of Hughes Tool.

At the solicitation of TWA president Jack Pyle, the company began purchasing TWA stock in 1936, until approximately \$5,545,000 had been invested. All parties to the proceeding agreed that the percentage of stock held by Hughes Tool Co. constitutes control of TWA.

Several aspects of the Hughes Tool Co.'s activities were questioned as being "phases of aeronautics."

Contracted with Lockheed.—A contract between Hughes Tool Co. and Lockheed Aircraft Corp. of June 30, 1938, covered construction and delivery of 5 Constellation airplanes. The contract restricted sales of this plane to other than Hughes Tool Co. or TWA. It was later modified to increase to 49 the number of planes Hughes Tool Co. would purchase, and to permit the government of the United States and Great Britain, Pan American Airways, and the Royal Dutch Air Lines to acquire Constellations.

In 1942, Hughes Tool Co., with the approval of Lockheed, assigned this agreement to TWA. Under the terms of the agreement as it now exists TWA is to purchase 15 Constellations, and Hughes Tool Co.

Financial Picture

Financial reports of Hughes Tool Co. to CAB's review on the TWA control proceeding reveal that as of Nov. 30, 1943, the company had a capital and surplus surplus of nearly \$1,000,000. Current assets were valued at \$25,000,000 against current liabilities of \$10,770,000.

53, the latter under an option through TWA.

AD Constellations manufactured are now assigned to the U. S. government, subject to an option to reacquire 40 planes by repurchase from the government.

TWA Debt Priority.—Restrictions against the manufacturer which would prevent the sale of Constellations type aircraft for domestic air transport use except by TWA continue under existing contracts.

Examiner Frank A. Law, Jr., states that "the obvious, if not expressed, purpose of these arrangements was to give TWA the benefit of the credit and financial standing of Hughes Tool in a transaction involving substantial financial responsibility."

The 25 Constellations Hughes Tool Co. is to purchase will be held "for resale and for experimental use."

Hughes Tool Co. is also manufacturing, under war contracts, aircraft parts and accessories, but the record in the case shows that this activity will not be continued by the company after the end of the war.

While these activities might be considered as engaging in a phase of aeronautics, the examiner found that "the possibility of wrong doing is no basis for the intervention of a relationship that has not proven harmful, but on the contrary has been and may continue to be helpful to the air carrier."

The only restriction Examiner Law recommended on approval of the relationship was a limitation on the ownership interests between TWA and Hughes Tool Co. to aircraft parts or accessories, not exceeding \$15 per item, and aggregating annually not more than \$10,000.

Ark. 'Copter Service

Two Chicago & Southern Air Lines officials appeared before the Arkansas Corporation Commission recently to support an interstate helicopter taxicab service proposed for that state by the North Little Rock Transportation Co. R. L. Heminger, general traffic manager, described Chicago & Southern's plans for a helicopter service. Bond Knight, superintendent of flying, testified on the helicopter's experimental characteristics. The firm's counsel stated that the Commission delay action until it has considered all air services that are now proposed for Arkansas.



U.S.-CANADA AIR MAIL 25 YEARS OLD:

The 25th anniversary of the first international airmail flight between Canada and the United States was marked recently at Vancouver. This old photo shows Eddie Hubbard (left) and W. E. Boeing in front of their Boeing C-17 airplane at Seattle on completion of the first airmail flight from Vancouver to Seattle in 1919. Dated Air Lines now operates the route.

Need of Hemisphere Port Plan Stressed

Creation of inter-American network, development of Latin American service urged at New York conference.

Increasing stress on the importance of airport planning and development in the United States is paralleled in the 30 other American republics.

The U. S. Office of Air Transport Information reports that these airports to have more than 2,100 civil airports in operation at the end of this year, compared with a probable 1,122 in the United States.

Port Survey Asked.—Delegates of all 21 American republics recommended at the first conference of Commissioners of Inter-American Development in New York recently that an immediate survey be made of airports and air navigation facilities in the other American. The conference urged by resolution the creation of a complete network of inter-American airports.

Meanwhile, a preliminary survey by the United States Defense Corp. through its American Republics Aviation Division, has shown that ton-mile volume of traffic in, and from Latin America increased more than 300 percent from 30,344,000 in 1940 to \$1,918,666 in 1943, equaling 39 percent of the U. S. domestic traffic in the latter year. Passenger traffic in Latin America was 76 percent of its total traffic last year. Cargo was 15 percent and mail 6 percent. Comparative figures in the U. S. are 76, 3 and 17 percent.

Cargo Volume.—In some cases cargo was equal or ahead of passenger volume. Cargo amounted to 50 percent of total ton-miles in Central America, 44 percent in Bolivia, 33 in Colombia and 20 in Peru.

Total ton-miles in 1943 were more than the estimated total traffic carried in 1938, the last pre-war year, by all European nations, including their overseas routes.

Latin America has almost the same tonnage as many route miles to there in the United States, but few only half as many miles last year, in a frequency of service about a sixth as high as that in this country. Average passenger service, despite slight decrease since 1943, are about 40 percent above the U. S. level. The conference urged that fares be reduced and frequency increased.

Utilization.—The DGC reported Latin American aircraft utilization in 1940 was 3 hours per plane per day against 9.8 in the U. S. Per-sign-hr carrier's average of 3.4 hours compared with 3.6 for U. S. flag carriers in Latin America. But flag carriers in Latin America. But

trends indicate that the next few years will bring increased utilization, which has been low because of low service frequencies, lack of night flying, inadequate maintenance facilities and the "advanced age" of many planes.

Last year 348 planes operated in Latin America, only 27 of them U S flag craft. Of the 346 multi-engine planes, 97 were of the modern type manufactured since 1930 and of the latter, 46 were U S flag ships.

5-Man Group Guides Airlines' Policies

Commerce, entering second year, stresses need for government regulation of competition.

The Airlines Committee for U S Air Policy, determined to keep a watchful eye on Congress and place more emphasis on regulation of competition in its documents of post-war international air routes, begins its second year under the guidance of a five-man executive committee.

It does away with the post of chairman, which Sam Robinson, chairman of the board of Northwest Airlines, is relinquishing. Robinson will remain, however, as a member of the new executive group, to which he appointed Thomas Burke, American Export Airlines, O M Mower, American Airlines, Jack Nichols, TWA, and Robert Thach, attorney and representative of Northwest Airlines, and former vice-president of Pan American Airlines.

Ends Aviation Law Practice—Robinson gave as a reason for his resignation his desire to represent Northwest as counsel in its battle with the Federal Aviation Board. The route applications before the Civil Aeronautics Board. At the same time he announced, however, that he will engage in the practice of aviation law in Washington, D C, dependent more which led to speculation on his future connections with Northwest.

Airline representatives who attended the "aggressive" meeting at which Robinson submitted his withdrawal made the usual recognition of committee work under his chairmanship and also approved unanimously an expression of determination that 17 major airlines—16 if Western and Inland are counted as one in light of their merger negotiations—to continue their campaign "against any monopoly in overseas aviation."

Competition Regulation—Sel-



EXPERIMENTAL TOWER:

The experimental combination communications and airport traffic control tower building shown above was constructed at Romeo, Va., by the Civil Aeronautics Administration for \$15,000. Built chiefly of wood, the tower contains offices for the Chief Tower Operator, the Chief of Communications, and meteorological unit.

man said at a press conference that the policy intended the same as it was when announced a year ago but increasing stress will be placed on the condition that the free and open world-wide competition advocated by the committee be subjected to reasonable regulation by appropriate government agencies. This was the first point in the policy declaration, the others calling for private ownership and management, government encouragement of a second world-wide air transportation system, world-wide freedom of transit in peacetime, and acquisition of civil and commercial outlets required in the public interest.

In the last connection, the committee feels that landing rights are a matter for government supervision and diplomacy. It also believes that the intricate network of navigational facilities set up by the military as a war measure should be made available for peacetime commercial flying.

World Route Policy—It was obvious that the committee feels one of its major duties is to keep in close touch with Congressional committees dealing with post-war international aviation. It probably means a stepping-up of the organization's efforts to "sell" Congress on competition as opposed to chosen instrument operation.

Two advocates of the latter community company idea, proposed in

the McCarran Bill, are Pan American and United Air Lines. United is also the only domestic hold-out in the policy committee group, whose meeting last week was attended by representatives of American, American Export, Braniff, Colonial, Continental, Chicago and Southern, Delta, Eastern, Mid-Continent, Northeast, Northwest, PCA, TWA and Western.

Port-Airline Leases Studied by ATA

Committee is examining agreements with view to establishing most of standard practice.

Airport agreements with the airlines, now pretty much a catch-as-catch-can proposition, are being studied by an Air Transport Association committee which hopes to establish a standard.

The Airport Agreements Committee, which meets at Minneapolis last week, has been working on two basic types of agreements. One is a long form for use at large airports where leasing arrangements are more complicated, and the other a four-page folder short form for situations where fewer clauses. The committee, incidentally, prefers the word "agreement" to "lease."

Plan Tried Out—Meanwhile, actual practice is supplementing the group's discussion. At Seattle, for instance, there is being tried a plan under which landing fees are being adjusted on the basis of gross weight.

Agreements between airports and airlines have been largely lacking in uniformity. There have been a few test agreements, and those written have shown wide variations. Generally the airlines believe in long-term leases, with periodic renegotiations. A recent survey by the Bureau of Government Research of the Chamber of Commerce at Indianapolis, where some leases are running out, indicated the agreement differences.

Note Variations Found—The Indianapolis study showed variations in monthly schedule rates and no definite policy on second sections. Some leases fail to cover airplane, crew, insurance or training. Right Most frequent minimum schedule rates are \$20 a month, although they vary in application from 2 to 14 monthly schedules. Five to ten year lease contracts are in the ma-

jority, although they vary from one year with monthly renewals to 20 years.

Administration building space rentals vary from \$1.50 to \$3 a square foot for ground floor to second floor rentals "rather common" at \$1.50 per square foot per year. The Bureau has evidence of variation in airport administration in negotiation of leases directly with city councils, boards of public works, park boards and boards created for the purpose. Other variations exist in responsibility for installation of radio and meteorological equipment.

Incomplete data were received on fuel service and passenger service. The Indianapolis investigators, finding that present contract terminations commonly include cancellation of air mail and U S Postal facility contracts,

WAL-TCA Office

Western Air Lines is opening jointly with Trans-Canada Air Lines traffic offices in Edmonton and Calgary.

WAL's northern terminus at Lethbridge, Canada, will provide a base for Trans-Canada traffic flowing 1800 Western-United States, and also is expected to provide an air gateway into the United States for a considerable portion of Alaska-geared traffic.

AAF Aids Airlines

The Army Air Forces Materiel Command headquarters at Wright Field, active since January, has agreed to make available supplies needed by the airlines when such material cannot be obtained from industry sources and are available from AAF surplus.

The situation applies to equipment, parts and accessories mostly needed by the lines as spare parts. Examples are G-108 Wright engines, which are needed for the DC-38 but are not now being manufactured.

Wright Field, it is understood, agreed to release parts only when they are unavailable elsewhere, and then only if they are surplus.

The airlines are and are to be heartily in favor of this condition, which avoids any sort of competition with parts manufacturing and is an emergency resort in the strictest sense.



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ENGINE 14 parts of Aero-Metal in engine bolsters, valve parts, nuts, bolts, and are found in almost every engine.



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CAB Pessimistic On Feeders

See traffic potential at small cities not encouraging.

Civil Aeronautics Board, in its opinion as its local-feeder-pickup investigator, echoed the same note of pessimism over the future of short-haul air traffic that characterized the early report by its engineers.

The Board's findings, which terminated a study initiated 18 months ago, supported the conclusions by Economists William J. Madden and Albert F. Denst that traffic potential at small cities is not encouraging.

To their controversial suggestion that extensions by presently operating air carriers be limited to cities of 45,000 or over, the Board replied that regional consolidation of applications, now established procedure, has eliminated necessity for such a restriction, proposed by the examiners to increase opportunities for feeder operators. "Need for services a local character," the Board said, "can be weighed in conjunction with local service proposals." In a word of caution it added that "in attempting to develop this potential, local air carriers will be competing with the most highly developed rail and highway transportation systems in the world."

The Board indicated a willingness to certificate for the proposed type of service, but set as safeguards limitation of such authorizations to temporary periods and their confinement to operators "which show 'reasonable expectation of success at reasonable cost to the government.'" Belief was expressed that three years would be sufficient to judge potentialities, and the Board suggested that applications not containing request for temporary authorization be amended to do so.

The Board rejected the examiners' recommendation of a top of 25 cents per mile rail compensation for local services, approving the purpose but holding that no pre-determined figure should be established as a uniform maximum.

In reference to helicopter applications, the opinion said: "We cannot be expected to grant an application for service which cannot be performed except by the use of a vehicle which is not obtainable for a number of years."

On proposed pickup services, the Board said, it will seek the advice of the Post Office Department, since these have their principal utility in providing postal services.

Spanish Agreement Held Significant

Authoritative State Department sources disclosed late last week that an "agreement in principle" has been worked out between the United States and the Spanish government to permit U. S. commercial planes to land in Spain. This means of reaching an agreement is cited as a significant example of the system of obtaining landing rights through negotiations between governments rather than by the application of military force by Pan American Airways which obtained such rights by private agreements between the airline and the country involved.

U. S. Minister-Ambassador in Madrid, Joseph P. Kamp, member of the Civil Aeronautics Board, Charles I. Stanton, Civil Aeronautics Administrator, and Fred Norvinger, chief of the First Region (New York) of CAA's Air Carrier Inspection Division, are in Spain surveying technical possibilities of landings there by U. S. airlines.

Assistant Secretary of State Arthur A. Biele, Jr., was understood to have directed the negotiating for the U. S. The agreement is interpreted as a significant move by the State Department to realize its announced intention of getting the best possible international arrangements for U. S. airlines. British sources disclose that the BOAC (British Overseas Airways Corp.) has sought similar rights in Spain.

ATA Body Discusses Sales Agreements

The Air Traffic Conference, a division of the Air Transport Association, meets at Denver this week, expecting to set on a tentative and sales agency agreement and details of interline procedure.

The proposed sales agency agreement, recommended by the conference's agency committee for adoption, covers relationship between agent and carrier in connection with sale of passenger transportation.

Agreements—Points dealt with in-

clude scope of agent's activities, agency address and employee; designation of agency; issuance and delivery of exchange orders and tickets, collections and remittances; representations as to routing; securing of accommodations; reservations; commission; cancellations, refunds, agency fees, liabilities, standards, and similar matters.

The conference also will discuss post-war plans as related to commission for sale of air travel and general industry thinking concerning the air travel plan, carrying of specialized literature on planes, passenger trip insurance, use of common rate ticket coupons, tariff simplification, and miscellaneous items.

Conroy Quits TWA

Vincent P. Conroy has resigned as vice-president of TWA in charge of traffic, a post he occupied five years. His duties have been taken over by E. G. Cocks, who has been TWA's general traffic manager.

Flight Additions

Airlines flight additions reported to Civil Aeronautics Board in mid-month:

All American Airways—Additional round trip Pittsburgh-Washington, starting July 15 at AM 49 B.

Chesapeake and Southern—Additional round trip Memphis-New Orleans starting July 15 at AM 8.

Delta—Additional round trip Atlanta-Fort Worth and additional round trip Charlotte.

C. C. Atlanta, both starting July 15 at AM 24.

Eastern—Additional round trip 80 Los Angeles-Washington starting July 15 at AM 47.

PCA—Two additional round trips Norfolk-Washington and additional round trip Norfolk-Detroit, starting July 15 at AM 14.

TWA—Additional round trip New York-Los Angeles and additional round trip Tampa-Boston and Monday, cargo only, New York-Chicago, opening of service at Ft. Worth, Calif., all starting July 15 at AM 2.

United—Additional round trip New York-Denver, starting July 20 at AM 37.

No discontinuances were reported.

SHORTLINES

▶ **Brant Airways** has occupied a new \$125,000 annex to its main hangar at Love Field, Dallas. The new building is 161 feet long, contains more than 4,000 square feet, and is one of 18 buildings 60 more than 17 acres that make up Brant's base.

▶ **Delta Air Lines** report for the first six months of 1964 compared with the same half of 1963 shows 34 percent increase in total pounds, 51 percent in total passenger-miles, 57 in air-cargo pounds and 18 in express pound-miles. Passenger traffic was up 36 percent and passenger-miles 46 percent. Load factor for June was 84.1 percent, the airline's highest, against a six-month average of 81.33.

▶ **Mar Airways**, only Egyptian civil aviation company operating in Egypt, was to begin service last month between Cairo and Damascus, according to *Foreign Commerce Weekly*. Turkish State Airlines was to begin its 3800 service between Ankara and Istanbul and Adana and Ankara about the same time. A new company, *Compagnie Deserteenne de Aviation*, C. p. a., was authorized to establish an air service for mail, express and passengers in the Dominican Republic.

▶ In an announcement reminiscent of the days of peace, Pan American Airways has published special excursion fares for the public for flights from New York to New Brunswick and Newfoundland on the trans-Atlantic route to St. John's. Round-trip fares with 45-day limit, exclusive through July 15, New York-Boston, N. B., \$41; New York-Boston, \$149.50; Boston-Boston, \$149.50. Space on trans-Atlantic departures from Le Grand, in the absence of connections, not used by trans-Atlantic passengers, is "usually available without priority." FAA says lighter load arrangements on the charter flights have made the arrangement possible.

Bell Leaves CAB

Civil Aeronautics Board lost another of its staff of trial examiners this month when Berdon M. Bell resigned to enter private law practice. Bell had been with CAB more than two years. He will specialize in aviation law at his private practice. Examiner Vincent L. Gargner, who resigned last month, also has opened his own law office.

The rules of practice of the Board prohibit former examiners appearing before the board as counsel for an applicant until six months after their resignations.

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Enterprise

A **UNREVEALED** CONTRACT PROGRAM for TWA's five war-worn Boeing 307 Stratoliners, already under way, has aroused keen interest in aircraft manufacturing and air transport industries alike.

1. Boeing with its renowned Stratoliner suddenly enters the field with a transport which may be a strong contender for post-war commercial business.

2. The Flying Fortress and Stratoliner, each previously considered uneconomical and out of the question as future airliners, are combined in what they will be one of the most economical transport types.

3. TWA, developer of the Lockheed Constellation, on which TWA's publicity has been concentrated, emerges with a second modern first-engineered transport which probably will be flying in regular public service before any other craft of similar size can be converted.

Because of the importance of its Flying Fortress and Superfortress production program, Boeing has been conceding generally in the industry at having had least opportunity to study post-war commercial requirements.

The original Stratoliner, never as profitable as originally planned, will emerge from their rebuilding process at Seattle looking more like Flying Fortresses with a Stratoliner facade. They will use Fortress wings, tail and landing gear. When combined with about 1,500 horse hp. will replace the original Wright rated at 1,100 hp. takeoff. The improvements will increase gross weight by almost 9,000 lbs., virtually all of which is payload.

This means that the Stratoliner's original payload will be doubled. Gross weight will be raised from an airline rating of 34,600 to about 45,000 lbs., although in their war work for the ATC the Stratoliners have been loaded above 48,000-lbs.

By using the Fortress wings, additional gas capacity will be available for longer flights, or this load capacity can be shifted to payload with less fuel. Performance figures of the new liner have not been determined.

Two of the five planes which were acquired by the Army from TWA have already been repaired and are undergoing conversion at Seattle. The others are to follow shortly. All five planes may be converted in six months, probably sooner than any domestic airline will receive other four-engine equipment.

Civil Aeronautics Administration officials have expressed interest in the conversion and have inspected the procedure. The first revised post war CAA tests before airline use, but thereafter certification of the prototype will pave the way for the other four unless other major changes are made.

Although manpower and other war problems will prevent construction of additional Stratoliners at this time, the possibility appears strong that when conditions permit, Boeing will be able, under demand, to go into production rapidly.

The arrangement is a credit to the ingenuity of

Boeing and TWA, and to the Army Air Forces which has permitted one of its heaviest working and most successful war contractors to improve its chances for survival after the war.

Example of Unity

THE APPEARANCE of top aircraft executives before the War Contracts Subcommittee of the Senate Military Affairs Committee was a significant step forward in the newly-united unity within the aircraft industry as well as in the industry's relations with the Accredited Chamber of Commerce.

Messrs. Ward, Woodhead, Wilson, Gearing and Berliner, all able spokesmen, were not speaking for Fairchild, Consolidated Vultee, United Aircraft, General and Engineering & Research Corp. They were speaking for the industry as a whole and their well-organized, literate testimony is certain to have an important effect on future Congressional action to prevent the destruction of the world's largest aircraft production plant and thus endanger world peace.

The nation's airlines could take a lead from the manufacturers' book. The transport industry resembles in some respect the status of the disorganized Accredited Chamber of a year ago. Despite public denials, there still is widespread prejudice and selfishness among the directors of the Air Transport Association with a striking failure to unite for the common good of the industry and its future. The industry simply cannot afford to continue at odds with itself and more of its real friends should tell it so.

Progress

IN LESS THAN 11 months of publication, AVIATION NEWS has attained its initial goal of 10,000 paid subscribers. This is months ahead of original schedule.

A high percentage of the total readership represents the leading executives of aircraft and accessories manufacturers, the airlines, private flying, state and Federal government agencies and associations.

All of these subscribers were paid, in advance, a yearly subscription rate almost 75 percent higher than they have ever paid for any other aviation news magazine. Renewal subscriptions, four weeks before the first subscriptions expire, were coming in from readers far ahead of the expectations of experienced circulation people.

This response is not only appreciated by the editorial staff of the NEWS. It also assures readers of a steadily stepped-up program of expansion of news facilities and editorial improvements in coming months.

ROBERT H. WOOD



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